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In This Issue—*Coining the Tourist Camp*

MOTOR AGE

Vol. XL
Number 4

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JULY 28, 1921

Thirty-five Cents a Copy
Three Dollars a Year

Hudson Dealers Have Always Prospered

Hudson dealers frankly admit their prosperity is chiefly due to the way people want what the Super-Six offers.

They are successful men. And much of their success is due to their own ability, energy and vision. Yet they unreservedly say they could have never won such rewards in profits and the expansion of their business, with any other fine car.

The Hudson Super-Six has been a leader of fine car sales for more than five years. Almost since its introduction, it has held that position. And Hudson dealers are leaders in every community. They have the finest stores. They typify the highest standards of automobile merchandising.

Those who do not meet that standard are eliminated. Yet, so carefully are men chosen, in the first place that today, 97% of the Hudson product is handled through men whose connection exceeds 8 years.

Thus Hudson franchises have meant not only profit, but permanence to the men that hold them.

They have meant security against the disasters which have periodically swept less well-founded companies to ruin in the industry.

The sure way to build prosperity is with a company whose product and organization hold a place of permanence in the business world.

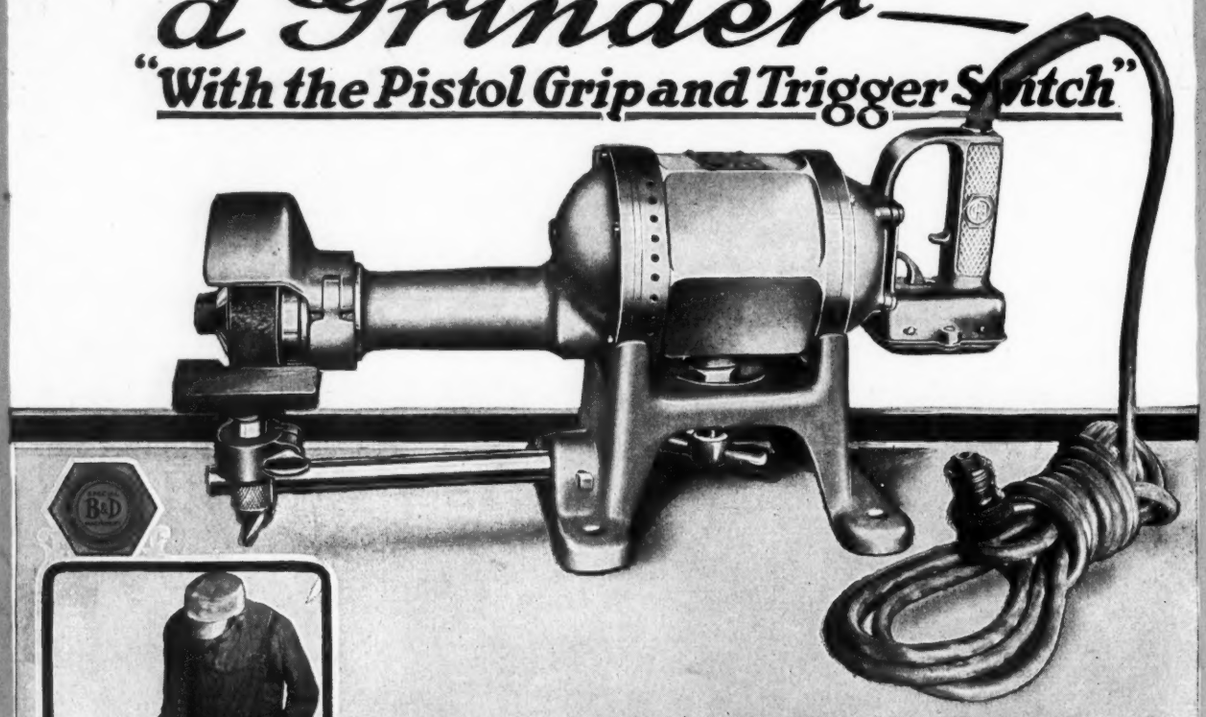
Hudson Motor Car Company HUDSON SUPER SIX **Detroit, Michigan**

(H-17)

Entered as second-class matter Sept. 19, 1899, at the post office at Chicago, Ill., under Act of March 4, 1879.

And now a Grinder—

"With the Pistol Grip and Trigger Switch"



BLACK & DECKER

Portable Electric GRINDER

With Quick Detachable Base for Bench work

Design, material and Workmanship are equal in every way to the Black & Decker Portable Electric Drills, which have demonstrated their quality so effectively for the past ten years that we are now manufacturing and selling more Portable Electric Drills than any other company in the United States, and, so far as we have been able to find out, more than any other company in the world.

While essentially a Portable Electric Grinder this machine is provided with *Quick Detachable Base* with adjustable tool rest and can be used with equal facility as a Portable or as a Bench Grinder.

SPECIFICATIONS

Black & Decker Quality Throughout
Operates on both A. C or D C. from ordinary light socket
1 2 Horse Power Motor
5 x 1 Grinding Wheel
Weight 21 lbs
Forced Air Cooling
Grease Lubrication
Offset Spindle
Protected against Dust
"Pistol Grip and Trigger Switch"

A FEW USES

Sharpening tools
Smoothing castings, welds, forgings, etc.
Grinding off rivet heads
Cutting off tubing
Shaping fittings
Roughing tires
Removing sand from castings
Removing rust, paint, road tar, caked mud, etc.
Smoothing auto bodies
Cleaning and brightning metal for painting, plating, welding or for polished finish

And in addition

This machine can be used as a power unit for testing generators, distributors, magnetos, etc. by mounting pulley on grinding shaft.

COMPLETE WITH—

15 ft. Duplex Electric Cable and Separable Attachment Plug
Quick detachable base and adjustable tool rest
Grinding Wheel
Wire Brush Wheel
Rag Buffing Wheel
Detachable Wheel Guard

NO EXTRAS TO BUY—

Price (110 volts) $110
(220 or 32 volt $4 40 additional)

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MOTOR AGE

Published Every Thursday by

THE CLASS JOURNAL COMPANY

MALLERS BUILDING

59 East Madison Street, CHICAGO

HORACE M. SWETLAND, *Pres.* W. I. RALPH, *Vice-Pres.*
E. M. COREY, *Treas.* A. B. SWETLAND, *Gen. Mgr.*

Member Audit Bureau of Circulations; Member Assoc. Business Papers, Inc.

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MOTOR AGE

MALLERS BUILDING, CHICAGO — Phone Randolph 6960, Cable Address "Motage"

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BRANCH OFFICES

DETROIT, 317 Fort St., W., Phone Maine 1351; CLEVELAND, 536-540 Guardian Bldg., Main 6432; NEW YORK CITY, U. P. C. Bldg., 239 W. 39th St., Phone Bryant 8760; PHILADELPHIA, Widener Bldg., Phone Locust 5189; BOSTON, 185 Devonshire St. Phone 4336 Ft. Hill.

SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions	$ 3.00 per year
Canada	5.00 per year
All Other Countries in Postal Union	6.00 per year
Single Copies	35 cents

Make Checks Payable to Motor Age

Entered as second-class matter, September 19, 1899, at the Post Office, Chicago, Illinois, under Act of March 3, 1879.

Owned by UNITED PUBLISHERS CORPORATION, 239 W. 39th St., New York, H. M. Swetland, Pres.; Charles S. Phillips, Vice-Pres.; A. C. Pearson, Treas.; Fritz J. Frank, Sec.

WE HAVE BUILT UP A STRONG RETAIL DEMAND FOR VAN KERR TRANSFORMERS

Extensive advertising direct to the car owner has told millions of automobilists about the Van Kerr Transformer; and will tell millions more.

In strong forceful language in magazines, newspapers and on billboards we have told the car owner how the Van Kerr Transformer gives him greater power, reduces gasoline consumption, prevents formation of carbon.

The result is that already we have over 100,000 satisfied users. That means that our advertising is getting the story over and making customers.

We want to line up the dealers now to sell the Transformers. We will continue to back them up with our result-getting advertising. We have created a big demand. We are going to make that demand bigger. And we offer dealers big profits in helping us supply it.

Sale Guaranteed

We can guarantee sales because we know how good the Van Kerr Transformer is and what a big and growing demand there is for it.

It sells for $2.00 for a four-cylinder set, $2.50 for a six-cylinder set.

You had better get in on this with us. Write for our proposition today.

The Van Kerr Co.,

3160 N. Clark St., Chicago

Biggest Quality Six Market That Ever Faced A Dealer!

MODEL 48

SIX $1585

F. O. B. Factory

Velie

MODEL 34

SIX $1385

F. O. B. Factory

The most astounding news of the year in motordom is the total cut of $400 on Velie Six model 48, pricing it at $1585. It is today America's Finest Quality Car at low price. It is the lowest priced six in the world, equipped with 7-R Continental Motor and Timken Axles. Search the market! No other car at any price duplicates its splendid specifications.

Another tremendous sensation is the total cut of $200 on Velie 34—the famous Velie that conquered the Grand Canyon—now pricing it at $1385! On its unrivaled performance this car has built a world wide reputation.

Every automobile prospect in the United States has been advised of this unparalleled opportunity to secure a **Velie Quality Six** at less than the price of ordinary cars. Velie price announcements are covering the entire United States. With the result that buyers of Quality at any price are realizing **how much money they can save.** Buyers who never before thought they could afford such Quality are realizing **how much more Velie gives them for their car money.**

We unhesitatingly assert that with the Velie at its present prices the biggest Quality Six market of all automobile business faces the alert dealer.

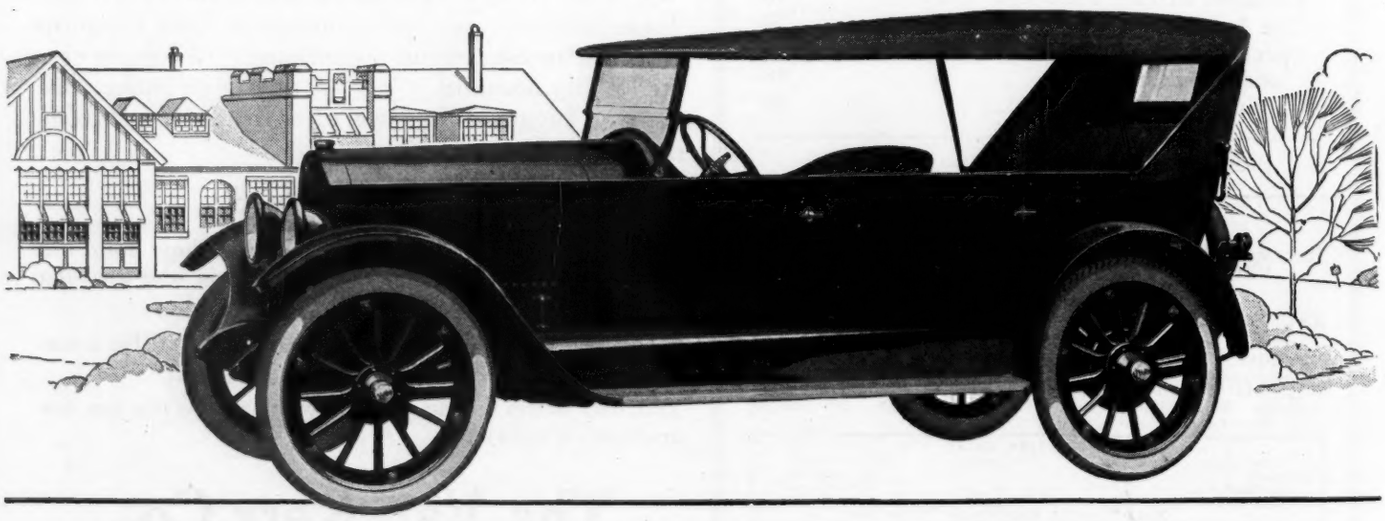
The demand upon the mile of Velie Factory today will convince you.

If your territory is not closed, we suggest that you get in touch with us at once.

VELIE PRICES

Model		Cut	Present Price
48	Touring	$400	$1585
48	Sedan	400	2485
48	Speedster	400	1800
48	7-pass.	300	1950
34	Touring	200	1385
34	Roadster	200	1385
34	Sedan	400	2085

VELIE MOTORS CORPORATION, 113 Velie Place, Moline, Illinois



Model 34 "Grand Canyon Six" $1385

VOL. XL., No. 4 CHICAGO, JULY 28, 1921 $3.00 Per Year

MOTOR AGE

This is the community camp at Clinton, Ia., on the Lincoln Highway, east and west, and Mississippi River Scenic Highway, north and south

Coining the Tourist Camp

Opportunity for the Dealer in the Small Town to Cooperate with Merchants for Tourists' Business

THE purely commercial side of the free motor camp site should appeal to automobile and accessory dealers, garagemen, and repairshop mechanics. It is a proposition "ripe for development." It is the pleasantest kind of business that makes both parties to the bargain satisfied with the barter! The thousands of bulging motor cars running over the roads this summer spell business for someone who is enterprising enough to meet customers half way—or a little more!

While the farmers are being "deflated" and cannot buy new automobiles as they did in more prosperous years, and while local retail merchants are feeling in consequence shrinking pains attendant upon "the return to normalcy," a lot of the people still have good coin of the realm and are taking motor camping vacations away from home. The use of their cars all day long, every day, spells the need daily of operating supplies and wear-and-tear renewals which the various motor industries of the towns on the highways can provide at a profit.

As the dunnage capacity of a car "loaded to the guards" with the average family of five, their clothing, knock-down furniture, canvas house, bulky bedding for cool nights in the open, dishes, utensils, etc., has limitations, campers are daily buyers of groceries, meats, ice, bakery stuff, kodak films, postcards, and items of clothing.

These supplementary needs are reasons why the related motor industries of towns on the main lines of travel can ask the cooperation of dealers in such things as a plan to solicit transients to "stop and shop."

The experience of the average family may serve as an example: if they motor 150 or 200 miles a day and pass through a town every five or ten miles, why should they patronize the garages and grocery stores of Smithville rather than those of Prairieburg? Because, though their offerings and prices may be identi-

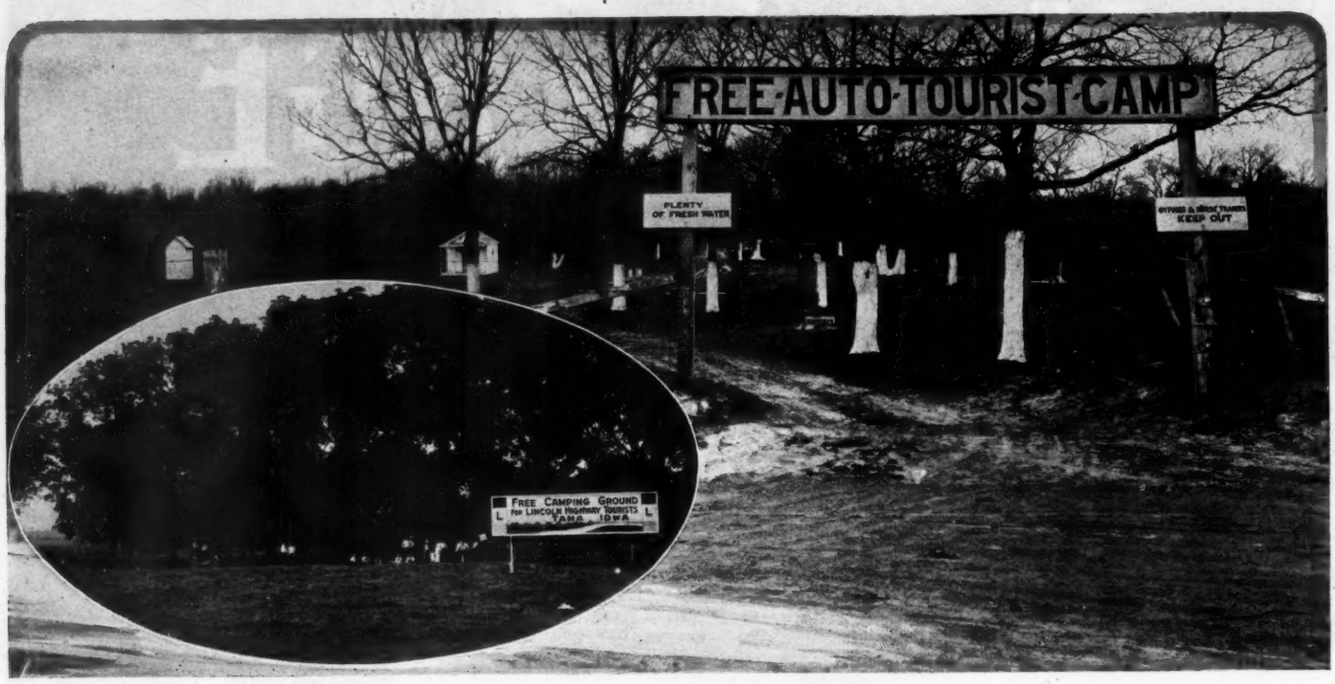
Why Not a Camp Site In Your Town?

IT often pays the automobile dealer to go outside of his business just long enough to see what's going on around him.

In the smaller towns, where usually exists a get-together spirit on the part of the merchants, it is possible to do things which result in the betterment of not only the community, but of the individual.

MOTOR AGE offers to its readers in this article the result of an investigation among hundreds of cities in the United States regarding community camp sites for tourists. The tourists spend money in these towns and much of it goes for automotive supplies.

Camps Like These Stimulate Business for Dealer and Merchant Alike



Tourist camp at Brookfield, Mo. The place is provided with every convenience for the tourist—wells, brick ovens, free firewood, etc. In the oval is shown a camp at Tama, Ia.

cal, the former has invited them to a comfortable camp, with a free leasehold for a night or a stay of days.

A fellow-tourist, bound eastward as they hasten west, may have hailed them to swap information about routes and road conditions and he tells of his enjoyment of the camp. They are likely to shorten or prolong the day, according to the mileage remaining, in order to make the camp. Unless in urgent need of some article before night they will save up the whole collection of shopping errands until the camp town is reached.

Over-night service is a most welcome convenience in such towns as afford it. When calling in the morning for repaired tires and a filling of gas and oil, the family may wish to buy some camp convenience. Perhaps a tourist may warn of a charming combination ahead: steep clay hills with overcrowned roads sloping sharply toward deep ditches, which when wet, make powerful motor cars skid. If they are carrying but two chains they will buy two more from Smithville's garage.

Before the world war a few tourist "Meccas," mostly in mountain states, had "started the ball a'rolling" in the establishment of camps for motor visitors. From 1918 onward, however, the increase in their numbers has been surprising, and this summer many more are under construction. They are in cities from the ridge of the Rockies eastward to Chicago, dotted over 20 states between the Canadian boundary and the Gulf—hence mostly in the Mississippi Valley and the high plains.

While some camps are in the largest cities of the region: Denver, Colorado Springs, Pueblo, Cheyenne, Kansas City, St. Joseph, St. Louis, Des Moines, Peoria, Lincoln, Minneapolis, St. Paul, Madison, Omaha and Louisville; and a middle-sized class of cities, such as DeKalb, Ill.; Sioux City, Clinton, Iowa City, Ia., Rochester, Minn. Mitchell, S. D., and Wichita, Kans.; **a heavy percentage of the camps are in towns of 5,000 population or less,** situated upon marked highways of at least state extent.

There is Columbus, Nebr., on the Lincoln Highway, population, 5,410. Its commercial club opened a 10-acre camp in July, 1920, and bears the costs, which are quite modest. It is near the city, on land leased for $25 a summer, with a well, trees, tables, and other conveniences as well as a caretaker, for whose part-time services $6 per month is paid. From July to November Columbus was host to 300 campers.

CONVENIENCES MAKE CAMPS POPULAR

Another town of approximately the same population is Brookfield, Mo., on the Pike's Peak Ocean-to-Ocean Highway. Its public-spirited Community Club opened a camp early in 1920 in a grove a mile east of town. As many as 25 tourists occupy it in a night. The accompanying photo depicts its improvements, which include water, fireplaces, free wood, toilets and a neat shelter house.

What has been done in small towns can be illustrated by the experiences of a long list of town of about 164 up to 3,000 inhabitants, most of those named running between 700 and 2,000 persons. In Iowa, Tama on a section of the Lincoln Highway, has a camp of 4 acres, affording comfort facilities; Lyons, near Clinton, also on the L. H. and on the Mississippi River Scenic Highway, has a camp 200 by 300 ft. near the center of town with a cooking house having running water, lavatory, gas stove with slot machine to operate the meter, a dresser, table and utensils; Ventura, Marble Rock, and Lake Mills have camps offering water and sanitation; Clarksville's camp on Pershing Way and the Shell Rock River, has water sports, bath house, well, sanitation, tables and seats.

Illinois has fewer camps in small towns, yet Wilmington and Medora may be cited. Hobart, in northeastern Ind., is opening a camp this season.

Several Kansas examples may be named out of many: Baxter Springs' camp, maintained by the Business Men's Assn.; Highland's, maintained by the city; Wamego opens her beautiful city park to campers, with picturesque boulder fireplaces having the tips of regular cooking ranges set in unique stationary benches and tables, modern comfort house, shade, water, lights, and many forms of recreation, as wading pool and play apparatus for small children, and boating, bathing, ball, and band concerts. Ellsworth, Marion on the Santa Fe Trail and Sabetha have modern conveniences.

Some of the smaller towns of South Dakota that invite campers are Sturgis, Spearfish and Whitewood. These, with those of Rapid City, Lead and Deadwood, serve motorists enroute to the charming Black Hills National Forest.

Of the North Dakota list Tioga is a sample of what a tiny town can do. It is on the Roosevelt Highway and offers lights, fuel and concrete cooking grids, with other attractions planned.

Among the progressive smaller towns of Minnesota that invite motor guests

(and they are many) may be cited Bowlus, Breckinridge and Long Prairie.

Wisconsin Good Roads authorities claim that about a hundred cities of their state, situated upon the 5,000 miles of well-marked State Trunk Highways, some of which are also touched by the transcontinental Yellowstone Trail, will have camp sites ready this summer. Most of the list are of small population.

Of Nebraska's camp hosts Gibbon, Cozad, Gothenburg, Chappell and Sidney are small towns, all led up to by the red, white and blue pole markers of the pioneer Lincoln Highway.

Practical details of how to establish camps and the direct and indirect financial benefits accruing from tourist trade with local merchants are shown by the following reports:

Clinton, Ia., states that its camp has proved a tremendous advertising feature for the city and has made many warm friends for this community among people scattered all over the U. S. and Canada. The Chamber, of Commerce, Canon City, Colo., states it has two camps financed by the city, and that tourist travel has increased from 6,000 in 1916 to 33,000 in 1920. During 1920, 3,567 cars were in its camps, and according to merchant statistics covering 3½ months thee spynt $165,000 in the city.

Billings, Mont., reports $56,189 expended by tourists in 1920. There were 9,772 campers last year, in 2,443 motor cars of 61 different makes, Fords predominating. By installing a telephone at the came the merchants received considerable trade. This was so convenient that many tourists stocked up with supplies to carry along. Great Falls, Mont., had all labor and materials used in its camp furnished at cost.

Billings, Mont., has a dance pavilion at the camp, the proceeds of which help pay its upkeep. Thermopolis, Wyo., erected $3800 worth of buildings in 1920. Camp maintenance for four months last year totalled $475, including $95 monthly for the caretaker and $18 a month for electric current for cooking. But more than $60,000 was spent by tourists during their stay at the grounds." Raton, N. M., proposes to spend $3,000 improving its camp.

An Iowa camp town states: "Our camp could easily be made to yield a little money but the men who donated the cost were of the opinion that the good will to be purchased by providing these facilities was of much greater value to the community."

TO CATCH TOURIST TRADE

The easiest and quickest way to cater to tourist trade in motor supplies and services this year is to obtain permission to use a site, and post roadside notice of it. Even that means something as compared with camping on a dusty highway, in front of a cemetery, or in a farmer's fly-ridden barnyard!

The city may allow the camp promoters the free use of a portion of the park. One of the contributing merchants may allow rent-free temporary privileges on vacant building lots. A farmer outside town might accept a small rental for a wood lot. Leased lands are used for camps in Clinton, Ia., Billings, Mont., Rocky Ford, Colo., and Fergus Falls, Minn. Even the jail yard can serve for a while, as in McPherson, Kan. Chautauqua Grounds lend themselves admirably, as at Devils Lake, N. D., and Winfield, Kan. The school yard serves in Cody, Wyo. When campers are numerous it is best to stake out lots and streets in the grounds.

Commercial or automobile clubs frequently provide the improvements and operating expenses for these camps. Sometimes a civic club of men and women can co-operate, knowing the whole community will reap a reward because local residents can themselves use the camp for vacations under canvas or for day picnics.

What Has Been Done

LAST year the tourists spent something like $56,000 in Billings, Mont. There were 9,772 campers in that city last year, in 2,443 motor cars of 61 different makes, Fords predominating, of course. The merchants of the town got busy and installed a telephone out at the camp. The result was they received considerable trade. And, among them were automotive men. Surely, what has been done in this western city can be duplicated in others.

FREE CAMPING GROUNDS
In Beautiful Lincoln Park
Six Blocks from Hotel Stilwell
Convention Auditorium at Main Entrance to the Park.
Large cooking ovens just been built, plenty of firewood and well kept grounds.
Park Commissioner W. C. Wilson extends to you a hearty welcome.
PITTSBURG CHAMBER OF COMMERCE

How the Pittsburgh, Kans., Chamber of Commerce advertises its camp grounds

In Gothenburg, Nebr., support is from "Campfire Girls and the public."

At Clinton, Ia., it is proposed to have Boy Scouts erect a cabin and police the grounds and run errands.

In Gainesville, Fla., the Chamber of Commerce called a modern version of the old fashioned "bee."

In one 8-hour day citizens of all classes, Boy Scouts and visitors cleared a 4-acre tract of weeds and brush, laid out streets, put in electricity, water and sewage, and built a neat community cottage for the use of tourists.

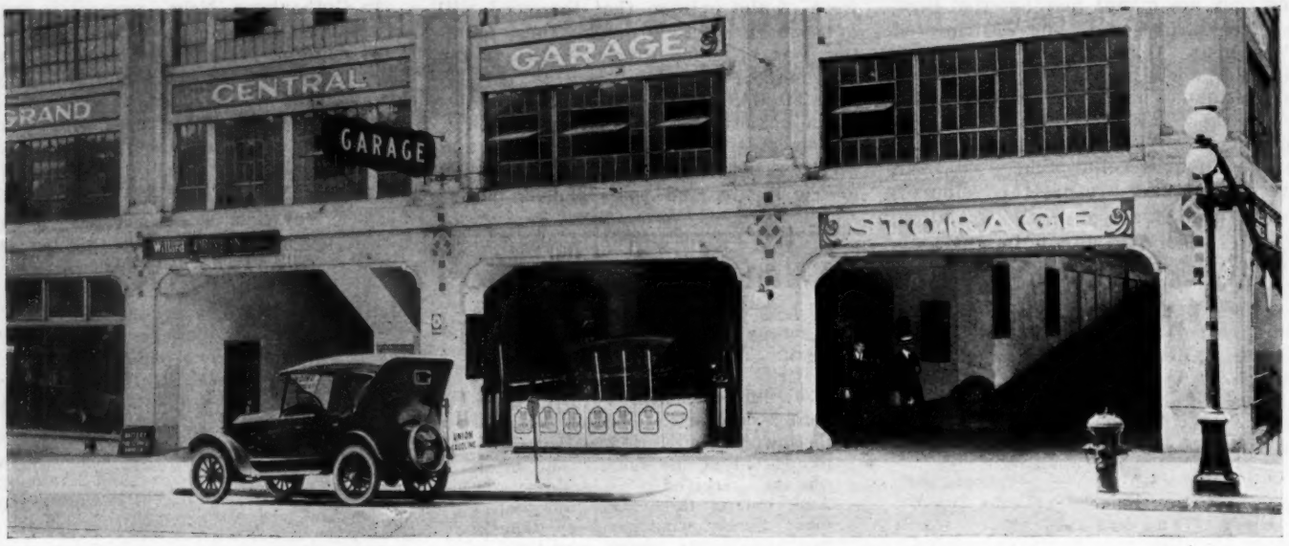
The invitations to camp hospitality should be posted along main roads outside and inside town, with directions for reaching camp. Small printed cards may be distributed through garages, drug stores and other centers. These cards are often carried home as souvenirs and shown to fellow-motorists. Coffeeville and Pittsburg, Kans., use such. Small 4-page folders or descriptive and advertising booklets invite to camps at Decatur, Ill., Minot, N. D., and Madison, Wis.

Conveniences may be added, a few each year, as patronage grows. The fundamentals are water and toilet facilities; where grounds lack electric lights campers can provide their own "glim" or oil or gasolene or acetylene street lamps could be set up. Fireplaces lessen fire risk and spare the grass and growing trees. Gas stoves serve camp cookery in Guthrie, Okla., Mitchell, S. D., Lyons and Charles City, Ia. Basin, Wyo., Winfield, Kan., North Platte, Nebr., Great Falls, Mont., Rochester, Minn. Electric hot plates or ranges are used in Denver Colo., Thermopolis, Wyo., and Kalispell, Mont.

CAMPS HAVE WASHING CONVENIENCES

Cleanliness of person and clothing is one of the hardest things to obtain in camp life, so baths and laundries are greatly appreciated and the women often stay over a day or two to bathe the "kids" and wash their garments. Gibbon, Nebr., reports, "conveniences for washing clothes." Kalispell, Mont., has laundry tubs, electric washer and smoothing iron in use all the time. Basin, Wyo., has tubs and means to heat water. Denver provides a modern laundry. Shower baths are a possible joy in the camps of Kalispell, Basin, Great Falls, Denver, St. Louis, Denison, Tex., Guthrie, Okla., and in the Nebraska towns of North Platte, Kearney and Grand Island.

Miscellaneous comforts are a hydrant with hose connection for filling radiators and washing cars, as in Sioux City, Ia.; tent floor, as at Deadwood, S. D.; tents all ready set up for loan, in Houghton, Mich.; telephone for ordering supplies to be delivered to camp; delivery of mail through the caretaker, as in Madison, Wis.; maps of the city or state or of the marked highway touching town; information about daily road conditions, usually obtained by the caretaker from incoming guests at night and given out through bulletin boards upon the grounds or from the office of the Commercial or Motor Club; containers for waste paper and garbage; proximity of filling station and food supplies.



Here is the way the front of the building of the Grand Central Garage, Seattle, looked after it was remodeled to cash in on the sales of oil, gasoline, etc.

Remodeled Entrance Increases Business Three-Fold

Owners of this Place of Business Appreciated Necessity of "Enforced Routing" for Car Drivers Past Gasoline Pumps, Oil, Etc.

THERE are undoubtedly many garages in every city and town in the United States that could show material gains in their sales of gasoline, oils, tires and accessories if they would make alterations in the street front of their establishments.

The sales end of a garage business can be made a very substantial item if it is properly exploited, but many garage owners fail to appreciate the necessity of "enforced routing" of cars conveniently past gasoline pumps, oil stands and an invitingly arranged accessory shop in coming in or going out of their garages.

It is not only those housed in buildings not essentially intended for garages, who overlook this feature, but those who build their own structures, as well. The experience of the Grand Central Garage of Seattle, constructed at a cost of about a quarter of a million dollars, will prove of interest to other garagemen and dealers, because it concerns the important matter of "front arrangement."

The Grand Central Garage, owned by the Pioneer Auto Co., is one of the finest establishments of its kind in the west. Four stories and basement in height, and exceptionally well-lighted, the sides being almost a mass of glass, the garage represented upon its completion about a year ago the very last word in garage construction.

But the planners overlooked the important matter of inviting purchases of gasoline, oils, tires and accessories. The main driveway from the street to the upper floors, 16 ft. wide, led direct from the street. The oils and the gasoline pump were located just inside the entrance on the driveway. For a car to stop and make a purchase was to block traffic in the driveway. After the car had driven out on the street it was found that nine times out of ten it would proceed on to the nearest gasoline station.

ACCESSORY SHOP WITHOUT DIRECT APPEAL

The accessory shop was located next to the entrance to the driveway but there was no direct appeal to the motorists to do their shopping there. The trade that was attracted by the accessory shop's having its facing directly against the sidewalk was overshadowed by the amount of trade that was lost from the 300 or more regular tenants and the many transients.

C. A. Kolstad, manager of the garage, decided that it was imperative that alterations be made in order that the leak permitting the diversion of a substantial volume of business in gasoline, oils and accessories be stopped. Inquiry developed that approximately $5,000 had to be expended in order to make the alterations—a rather substantial sum in these days when money is tight. But Kolstad and his associates ordered the work done.

The accessory shop was moved back 16 ft. from the sidewalk and a space 16 ft. wide and 36 ft. long, leading off the main driveway to the upper floors, was provided. Cars coming into the garage could drive in between the accessory shop and the gasoline pumps and oil stands before proceeding up the driveway Likewise, the same course invited the motorist driving out of the garage.

During the first month after the alterations were completed, the amount of business done in gasoline and oils and accessories was three times the amount of business done in the month before alterations were undertaken. To every dollar that was received before, three dollars were later taken in.

"To every garage owner who pauses before the expense involved in making needed alterations, I would suggest that he make a careful survey of the future and profit by experience such as ours and that of many other garages who have

faced and solved problems such as we did," said Mr. Kolstad.

System and aggresive business sense are the reasons for the success of this company. All storage of cars, whether "live," permanent or transient, demand payment in advance. Credit on oils, gasoline and accessories are only extended to "prompt pay" customers. No laxity whatever is permitted in credit extension, with the result that virtually no losses have been suffered.

The motorist entering the Grand Central Garage cannot but be impressed by the systematic organization. As he drives up to the entrance, a man is always there ready to care for his wants, irrespective of the time of day or night. In this connection it is interesting to note that Mr. Kolstad lays particular emphasis on the undesirability of false economy in help. He believes that a garage should have sufficient employes to render prompt and efficient service at all times, and particularly that there should be some person at the main entrance to receive the motorist.

If the motorist desires to become a regular tenant, he is requested to write his name and address on a printed "application for storage." It is explained to the car owner that the garage requires him to do this for his own protection. If the owner should desire to send some other person to the garage for the car, the signature on the order presented from the carrier to release the car will be compared with the signature on the application blank so that no misrepresentation can be successfully carried out.

After the application for storage has been properly filled out, the car owner is requested to drive to the floor the "entrance keeper" designates. The "entrance keeper" then notifies an employee on the floor above that the car is on its way up by ringing a bell, and the employee is ready to care for the wants of the motorist when he reaches his floor.

Once assigned a stall, a card is made out containing the stall number, name of owner, address, make of car, license number, date first received, etc. This card is kept on a rack with the cards describing the cars and owners of other cars in the stalls on the floor.

To permanent tenants all sales of gasoline, oil or grease, or any service that may be rendered is noted on a daily report sheet turned into the main office by each department at the end of each shift.

To transients, a special card is issued. The main portion of the card contains the following information: car received by ———; name of owner; address; make of car; license number; date received; time; and amount due on storage, gasoline, oil, grease, wash, polish or any other items. The lower portion of the check is torn off when issued and given to the owner as a "claim check."

Learning Approved Shop Methods Through Service

It seems to be the fashion these days to hold service classes attended by dealers, service men and others for the purpose of getting a better understanding as regards the accepted manner in which any particular make of car ought to be serviced. Here is shown a service class of Dodge Brothers dealers in Louisiana and Mississippi conducted in New Orleans during the last week in June by R. G. Word, traveling service instructor for Dodge Brothers. The classes were held in the shop of the Fairchild Motor Car Co., Inc. These lectures are being given all over the country for the betterment of Dodge Brothers' service

France and Belgium Experimenting with Alcohol-Benzol Fuel

By W. F. Bradley

European Correspondent of Motor Age.

PARIS, July 15.—Gasoline costs have dropped steadily in both France and Belgium during the last six months and promise to fall still more at an early date. Around Paris high-grade gasoline is now being sold at $1.55 the American gallon. The supply of benzol is very irregular.

In Belgium the curb-side selling price of gasoline has dropped to 75 cents per American gallon and is expected to drop a few cents more. The difference in the selling price between the two countries is due to the existence in France of big government stocks, purchased when prices were high, which importers are compelled to buy at disadvantageous rates. State taxes on gasoline are also responsible for the higher price in France. The fall in gasoline prices is helping considerably to revive the automobile industry. Automobile manufacturers report better business during June, while tire and accessory dealers announce a decided improvement.

A lot of attention is being paid in both countries to alcohol-benzol mixtures for automobile use, by means of which it is hoped to make France and Belgium independent, or partially independent, of foreign gasoline. A plan is afoot whereby Belgium will supply benzol to France and France will send alcohol to Belgium. Numerous experiments have been carried out, particularly by the General Omnibus Co., of Paris, in order to determine the most suitable alcohol-benzol mixtures. The following are the more important results:

Mixture.

Alcohol 10%, benzol 75%, kerosene 15%: Same power and same consumption per hp. h. as with benzol.

Alcohol 25%, benzol 60%, kerosene 15%: Slight loss of power and increased consumption per hp. h.

Alcohol 60%, benzol 20%, kerosene 15%: Very difficult to start, important loss of power, blow back to carbureter, no change in consumption.

Alcohol 60%, benzol 50%, kerosene 25%: Blow back to carbureter, incomplete combustion of kerosene, smoky exhaust. Mixture unsuitable for existing engines.

The following mixtures are proposed by experts for big users of automobile vehicles:

Prof. Perisse: Alcohol 76%, turpentine 19.2%, gasoline 4.8%.

Letombe & Mauclere: Alcohol 65%, ether 10%, hydrocarbure 25%.

Company des Voitures (taxicabs): Alcohol 50%, gasoline 25%, benzol 25%.

Prof. Lange: Alcohol 60%, benzol 15%, turpentine 25%.

G. Bertrand: Alcohol 50%, ether 50%.

The SERVICE MANAGER Speaks:

What Is Needed Is a Thorough Mechanical Knowledge of the Product With a View to Eliminating Unnecessary Labor

By E. M. Neils

Service Manager, Great Western Motors, Inc., Seattle

OVER my office door hangs a sign which reads: "SERVICE—Our Ability to Meet Your Needs and Requirements, Promptly and Efficiently, At a Profit to You and Ourselves."

Service is the most vital issue of commercial competition today and it certainly cannot be denied that it is the vital spot in every dealer organization. Service does not now, as in the past, mean something for nothing. It has taken on a wider meaning than simply repairing cars and giving free work. Neither will an efficient shop organization alone solve the problem, because good service demands that the whole organization in its different departments be efficient.

It requires a thorough mechanical knowledge of the product and a study of its construction with a view to eliminating unnecessary labor. It requires adequate shop equipment and the elimination of poor equipment and inefficient methods, as far as possible.

It absolutely demands an efficient and businesslike recording system. It requires that every man be imbued with a feeling of responsibility for his work; the weeding out of the careless, incompetent and indifferent workers; and also a continual study of present methods and a continual striving for better, more efficient methods.

The crying need at this time is for better, more capable mechanics—men who are really skilled at automobile repairing and who are ready and willing to add as much as possible to their knowledge. It is to the dealer's every advantage to help his men along this line. He can aid much by proper instruction, by better working and housing conditions, by better pay, by enforced but not too rigid discipline, and by taking an honest interest in his employees.

Service should be sold on the basis of the customer's needs only, and the customer should have as much information as possible about the work beforehand. Comparatively few owners realize the amount of work or the cost of parts involved in repairs, and dissatisfaction can be avoided by giving them an idea of the cost in advance.

Service Managers

HERE is your opportunity to get a lot of things off your chest. You may or may not have some grievance against the business in which you are engaged, but at any rate here is a chance for all of you to sit around the table and talk over a lot of common problems. We feel sure that after you read what Mr. Neils has to say on this page that you will write us along similar lines. Remember, this is your department and you can say what you like. Have you any new thoughts on service? Tell us about them.

BEST SERVICE BY FLAT RATE PLAN

Through the flat rate or maximum estimate plan the customer can have an understanding with the service department in advance that the entire charge for labor and material will not exceed a certain definite amount. If he is obliged to limit his expenditure to a certain amount he can decide which of the repairs he wants done, and he can determine whether the results will be worth the expense. Under these conditions, there can be no argument when the bill is presented, because the owner knows in advance how much the bill will be.

Sometimes it is advisable to reduce the repairs ordered and sometimes it is necessary to add to them, but in either case it should be done only with the full consent of the customer. Sometimes a car may need more repairs than a customer wants to have done. Selling him these repairs, then, involves considerable diplomacy.

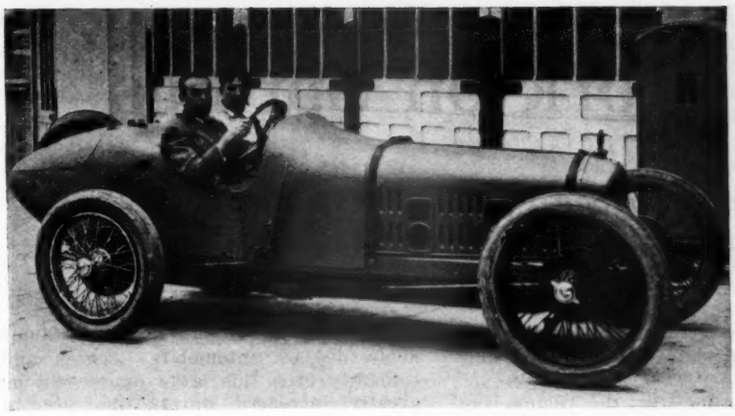
The successful service man must be not only a mechanical expert, but a business man, a salesman, and a past master in the art of diplomacy. He makes it his business to become personally acquainted with every customer, to talk with him to find out his likes and dislikes, and to find whether accessories should be sold him and whether any of his friends are in the market for a car.

It goes without saying that while service work must be well done, of equal importance is cleanliness. Be the work ever so well done and the customer's opinion of your ability ever so high, if his car is returned to him in such a condition that he has to have it cleaned, his opinion of your service as a whole will not be flattering, to say the least.

PROPER MAINTENANCE IMPORTANT

The importance of proper maintenance of a car cannot be overestimated, and it is of vital concern to the dealer that all new owners be properly instructed in the care of the cars—not only new drivers, but old drivers who have bought a new car. Efforts should be made to have owners bring their cars in at stated mileage intervals to have a thorough examination. A smooth-running car is of as much value to the dealer, from a sales and advertising standpoint, as it is to the owner himself. Therefore, it is to the dealer's advantage to help the owner keep it running sweet.

Promises impossible of fulfillment should never be made. Every cause for complaint should be eliminated, as far as possible, and every complaint that may logically develop should be promptly investigated and satisfied. Many customers become worried or dissatisfied after they have taken their car from the service station, and never speak of their apprehensions. The only way to get at these things is to get in touch with the customer himself several days after the delivery of a new or repaired car in order to be sure that everything is satisfactory. Any cause for dissatisfaction should be promptly investigated and as promptly made right, even at a loss on that particular transaction. The customer's good will must be obtained, and that good will retained, as complete satisfaction to the customer is the main essential of good service.



This shows one of the Ballot race cars driven by Louis Wagner in the Grand Prix. The other view was taken along the course

Jimmy Murphy Wins Grand Prix Race

American Driver In a Duesenberg Car Takes First Honors in Great European Classic at Le Mans, France; De Palma Finishes Second

Special Cable to Motor Age

LE MANS, France, July 25—"Jimmy" Murphy, youngest driver in the Duesenberg quartette, won the Grand Prix today. This is the first time in the history of this celebrated race that an American car has won. Ralph De Palma, another American, finished second. Guyot (French) was third, but his place may be contested on the grounds that he received aid in changing a tire. The French drivers did not run according to form and there is much disappointment as the result.

Murphy's time for the 321.78 miles was 4:7:11, or 78.22 m.p.h.

This year's French Grand Prix automobile race, the first of its kind since 1914, was held on a fast triangular course 10.7 miles long. Thirty laps were necessary, or 321.78 miles. The course is on the outskirts of Le Mans.

Although this race is organized by the national body, the Automobile Club of France, the local club at Le Mans has taken an active part in the preparations, and hopes to get permission from the government for the transforming of the set of roads into a permanent speedway. It is not intended to close the roads to ordinary traffic, but to have permanent stands and pits, barricades and bridges, and to have the right to close the roads whenever speed contests are to be held.

The race was run clockwise, the start being made on a fourth-class road, which had been widened to 40 ft. Two miles from the starting point the racing cars ran into the Pontlieue hairpin turn, which was approached on a slight downgrade and followed by a slight up-grade.

By W. F. Bradley

(European Correspondent, Motor Age)

Owing to the nature of the road, it had not been possible to bank this, and to prevent excessive wear, most of the surface on the turn was paved with granite blocks.

After the hairpin the course was a national highway for five miles, the road being very wide, dead straight, with the exception of three easy bends, the maximum upgrade being three per cent, the maximum downgrade four per cent, but the greater portion being level.

Jimmy Murphy with the winner's smile

After a righthand right-angle turn, the cars got into a crossroad through a pine forest. This road, although level, called for a drop into lower gear—second for the Duesenbergs and third for the Europeans—and this gear could not be left, owing to the sharp turns, until the first, or grandstand, leg of the course was entered. Coming up towards the grandstands, a speed of 100 m. p. h. is possible, despite the slight rise. The entire surface was relaid for the race, and calcium chloride was used as a dust preventive. Nearly the whole of the course was barricaded, and regular army troops were employed to maintain order.

As the French Grand Prix regulations called for a maximum piston displacement of 183 cu. in., with a minimum weight of 1,763 lbs., practically all makers preferred the 8-cylinder ahead engine. The exceptions confirm the rule. Jules Goux's Ballot has only four cylinders of 2 liters, or 122 cu. in., displacement, but this car was put in owing to the wreckage of the 8-cylinder car driven by Renard, who was killed while in practice. The Mathis also has four cylinders with a piston displacement of 1½ liters, or about 92 cu. in.

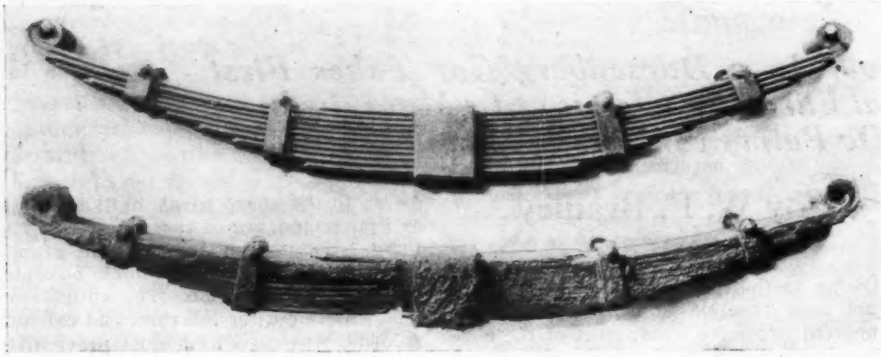
The Pallot cars are on the same general lines as those which came to Indianapolis this year. Ralph De Palma drove the car with which he won most of the lap prizes on the Indianapolis track this year, the engine only having been changed. These cars have been built in the Ballot factory in Paris, to the designs of Engineer Henry, who before the war was head of the Peugeot racing team.

The eight cylinders measure 2.5 by 4.4 in. bore and stroke and have four valves per cylinder, operated by two overhead camshafts, driven by a train of spur pinions at the front, all the pinions having ball bearings. The crankshaft is carried in five ball bearings. Two Claudel carbureters are fitted, ignition being by a Scintilla magneto, with K. L. G. plugs.

Maintenance Work on Springs

Many Service Stations Overlook This Vital Part of the Work. Faulty Steering Often Due to Springs

ONE phase of the repair business which is overlooked by many in the maintenance field is service on springs. It is possible to find many dealer establishments which are not in a position to take care of their customers' spring troubles. This is borne out by the fact that the large spring replacement businesses throughout the country daily get orders for express shipments on certain types of springs. For every order thus received it means generally that somewhere a car or truck is being held up pending the arrival of the spring.



The good and bad in springs. A properly lubricated spring, tight shackle bolts and clips mean longer life to the whole chassis. Rusted and stuck leaves result in wear of the chassis members and ultimate breakage

A MOTOR AGE representative recently went through the establishment of one of the largest replacement spring makers, the Temme Spring Corp., Chicago, at which the following facts were brought out:

The dealer or repairman whose services are entirely depended upon when it comes to spring troubles is not always on the job.

An excellent example can be cited through daily occurrences at the company's service station in Chicago, where it is handling on the average of 125 cars per day during the months of warm weather. Attention is frequently called to the fact that in several parts of this city there cannot be found a garage or repairshop which can conveniently and promptly take care of customers in their surrounding vicinity on spring replacements owing to lack of sufficient stock. In fact, only about 25 per cent of cars received at the service station can be considered local business, the rest coming from all parts of Chicago and suburban towns.

While it is a fact that the Temme company has at this time somewhere in the neighborhood of about 6,000 service stations established in the United States, including many large distributors scattered throughout all parts of the country, there can be found many towns where dealers are not prepared to take care of their customers' spring troubles.

The average car owner and especially the tourist, is prepared against possible tire trouble by having an extra spare tire along, or, at least, spare tubes and extra patches and tools which will meet almost any emergency; and, besides, these repairs can be obtained in almost every town or village.

SPRINGS SUBJECTED TO MORE CONSTANT VIBRATION

Now let us take the spring into consideration. Hardly ever does one find a car owner, even a tourist, prepared against an emergency of spring breakage by carrying an extra spring. No other part of the car is subjected to more constant vibration and possible breakage than the springs, especially in travel over rough roads. For this reason it is important that the dealer carry at least a small assortment of the most popular makes and models of springs to enable him to serve his customers just as promptly on spring trouble as on tire trouble.

The average repairman has really never taken into consideration the importance of a spring department. The spring replacement business is yet in its infancy. During the year of 1920 there were issued in the state of Illinois alone about 600,000 automobile licenses and evidently even this large figure will be greatly increased during the present year. Recent figures estimated by the S. A. E. show there are approximately as many springs replaced each year as there are cars and trucks in service. This estimate, no doubt, is rather low than high, when it is considered that most cars have from four to seven springs. The above figure would really place the life of the spring at four years each.

Springs on a car should be looked over and taken care of in the same manner as any other part. A large percentage of spring breakage is entirely due to the fact that they are not kept properly lubricated; as a result, rust forms between leaves and they become corroded and freeze. Finally, the spring will lose its temper and either break or flatten out.

Very often, car owners will complain that their cars are either hard to steer or that the brakes will not work properly. In both cases, very often, these conditions can be blamed to the flattening of the spring below the standard arch. Very often, it happens that this trouble is only experienced when the car is loaded down. This, of course, will explain that while the springs are not entirely flat or sagged below standard arch, they are, however, too flexible or weak. Trouble of this kind can be eliminated by adding an extra leaf or two in each spring. Also, if the spring has sagged below standard arch, it should be retempered and re-arched to raise the body of the car up where it belongs.

In the Temme service station they have had several experiences where the customer complains he has repeatedly had spring breakages, although he has not used the car on rough roads. After examining many of these complaints, it has been found that the trouble was in a bent or twisted axle, or in a slightly twisted or bent frame horn. Naturally, this will cause a strain on the spring which sooner or later will break it.

When a broken spring is being replaced, the fact should not be overlooked that a new spring will have the standard arch, and in case the spring on the reverse side of the car has flattened out, the new spring will not match. The result is that the car will not stand level, and a greater strain will be thrown onto the weaker spring.

Another point of importance is that a spring is designed for the car as it leaves the factory, and in cases where a car owner uses a winter top on a touring car

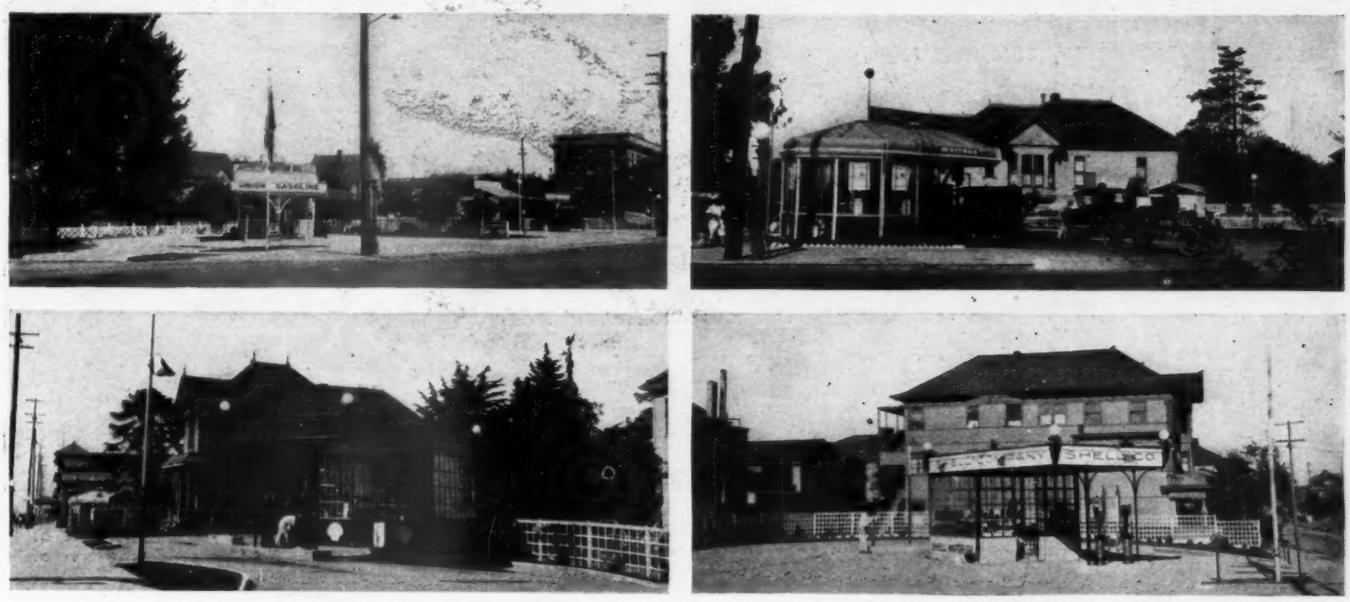
body, it must be considered that this additional weight will require a heavier spring. Very often truck operators find it necessary to carry heavier loads than those for which the springs originally were designed.

Spring quality depends to a large extent on the workmanship in the fitting of each leaf. While a spring might be made from the finest grade of steel, if each leaf is not equally arched and perfectly fitted the strain under load will naturally be uneven.

When a spring is being repaired, and the old leaves are being replaced, it is highly essential that the remains of the old spring be re-tempered and re-arched equally with the new leaves, otherwise the greater part of the strain on the spring will be thrown onto the new leaves.

Making the Gasoline Filling Station Fit the City

Tends to Remove Opposition to the Establishment of Such Buildings in Residential Districts



Some typical filling stations of Berkeley, Calif. Most of them are evident but not obtrusive

IT is just as easy to make the service station a thing of beauty, to make it match its surroundings in residential or business district, and yet have that station attract the attention of every passing motorist, as it is to have the station a flamboyant bit of discord, obtruding itself on every eye. Without being told to do so, and with no laws directing them how to build, the service station owners of Berkeley, Calif., have found a way to make their stations harmonize with the residential and business districts of that city of 60,000 inhabitants, where there are about two score of service stations, scattered from the industrial area on the shores of San Francisco bay to the beautiful bungalows, chalets and residences of the hills above the University of California's vast campus.

With a remarkable unanimity of design all the several distributors of gasoline and oils in the business district have followed a design which gives the impression of an ornamental kiosk, a bandstand, or, at most, a candy or soda stand. A modest sign proclaims the fact that motorists' needs are supplied within. In the residential district, special effort seems to have been made to conform the outlines of the service station buildings with those of the surrounding residences, and to put them in such positions, in curving embrasures in the hills, and at the bottom of steep slopes, that they are not in evidence until one drives suddenly up to them.

All of this has tended to remove opposition to the establishment of service stations in the residence district of Berkeley, so that the better building program of the gas and oil companies has returned a benefit to them as well as improved the city's general appearance.

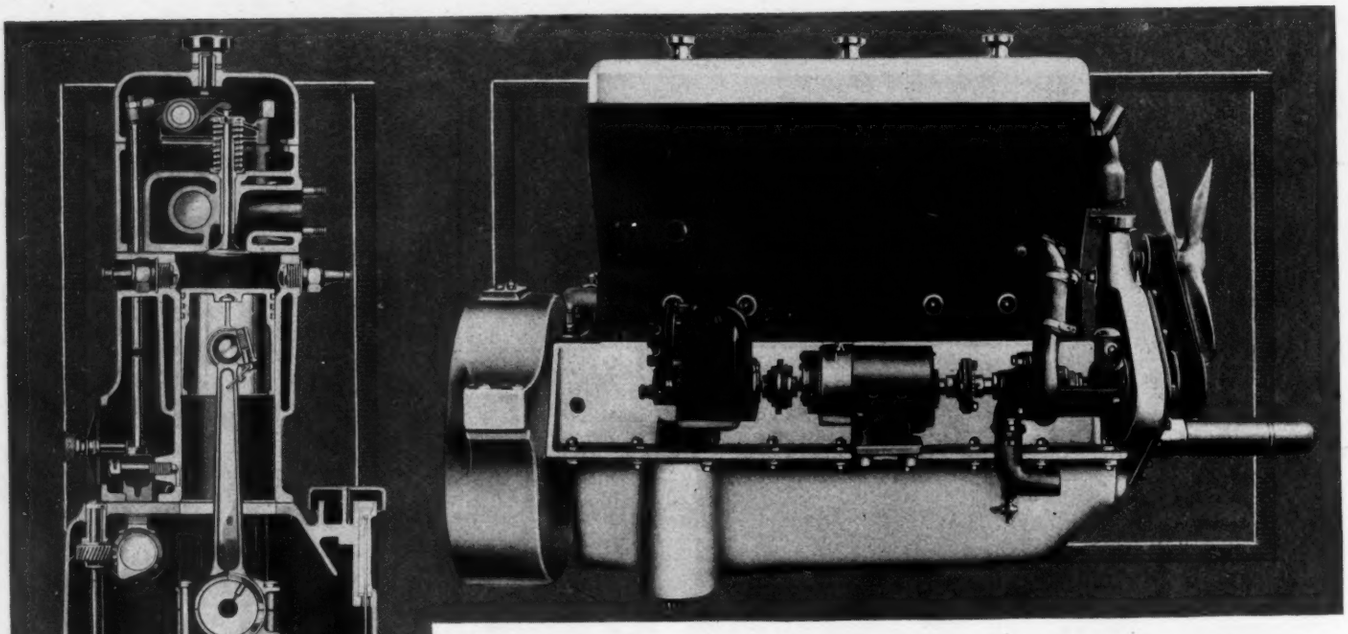
Census Bureau Defines Term "Repairshop"

IT will be of interest to those engaged in the automotive industry in any branch to know what the Government Census Bureau considers a repairshop. Here it is:

The census of manufactures includes automobile repairshops only when they use power-driven machinery and partake of the nature of a machine shop. An establishment storing, washing and making minor repairs on cars is not included. The shop must be so equipped as to be capable of manufacturing new parts, if necessary, or it does not come within the scope of the manufactures census, which is confined to factories. If a concern stores and sells cars and also maintains a repair department of sufficient importance to come within the census, a segregated report is required and only the statistics for the repair department are included.

Rochester Engine Combines Racing And Commercial Practice

Engine Is a Development of the Rochester-Duesenberg Horizontal Valve Type, But Uses Overhead Valves



Left, cross-sectional view of the new Rochester engine. This gives a good idea of the general construction. Right, exterior view, showing the accessible manner of placing and driving the accessories

THE Rochester engine is an interesting combination of racing and commercial practice. This engine differs materially from the Rochester-Duesenberg four, an engine utilizing the horizontal valve, long a feature of the Duesenberg engine. The Rochester six is a development of this type but uses an overhead valve with overhead rocker arm action in place of the long, side rocker arm.

The engine has two valves per cylinder. It is a block-cast unit with detachable head in which the valves are carried. The crankcase is of the conventional type, the upper half carrying the main bearings. Aviation practice has been followed in that the main bearing studs run completely through the case, holding down the cylinders.

The cylinders have a bore and stroke of 3.6 by 5 in. Maximum horsepower is developed at 2600 r.p.m., the main horsepower at this point being 80. The cylinder casting is of semi-steel and noteworthy for its clean exterior. On the right side of the block there is only the water outlet and valve adjustment cover plate. The exhaust manifold and carbureter which is of the horizontal outlet type are bolted on the left side as the intake manifold is integral with the cylinder head.

PISTONS OF CONSTANT CLEARANCE TYPE

The pistons are aluminum alloy, of the constant clearance type. In this piston, the head is partly separated from the skirt by means of a slot which offsets the normal expansion of the metal. The pistons are of the flat head type and equipped with three rings, all above the wrist pin. The wrist pin is of seamless steel tubing, hardened and ground. The pin floats in the piston, being clamped in the end of the connecting rod. The piston assembly weighs 1 lb. 4 oz. The clearance of the piston skirt is .004 in. on the pressure side and .020 in. longitudinally.

The connecting rods are I-beam section of the two-bolt type, the weight of each being 3 lbs. The lower rod bearing is a bronze backed, babbitt type, the cap being retained by two nickel-steel bolts. The crankshaft has three bearings. The shaft is of the inherently balanced type with moon shaped throws. The bearings are babbitt-lined and bronze-backed. The bearing sizes are of 2¼ in. diameter throughout, the lengths being, respectively, 2.5 in. for the front and center bearings, and 3.5 in. for the rear bearings. The flywheel is a steel forging.

The valve actuating mechanism consists of a train of three gears. The camshaft and water pump drive gears are steel and the camshaft gear is akelite. The cam followers are carbon steel of the mushroom type, operating in cast iron guides bolted to the cylinder blocks and detachable in blocks of six. The push rods are of seamless steel tubing, being of the ball and socket type. The upper end of the push rod is socketed to receive the ball on the end of the rocker arm.

The rocker arms are also of carbon steel with a hardened button which bears on the end of the valve stem. The other end of the rocker arm is drilled and fitted with an adjustable tappet bolt, the lower end of which rides in the push rod socket. The position of this bolt is secured by a lock nut and movement of the bolt provides adjustment on the valve

drive. The rocker shaft bearing is bronze bushed, the rocker arm shaft being of steel tubing secured in three brackets in the cylinder head.

The valves are of 1 9/16 in. clear diameter with ⅜ in. lift. The inlet valves are nickel steel and the exhaust valves tungsten steel. There are two coil springs to each valve. Over the valve mechanism is an aluminum alloy cover.

Lubrication is by a full force-speed system. Oil is pumped by a gear-driven pump from the camshaft by helical gears. The entire oil pump may be removed as a unit from the base of the engine for cleaning. The oil is forced to the main bearings and connecting rod bearings, as well as to the camshaft and rocker arms. Overflow from a release valve lubricates the water pump shaft and timing gears. The pistons, piston pins and cam followers are oiled by spray.

The cooling system is by a gear driven, centrifugal pump. The fan pulley is located on the forward end of this shaft, which also takes care of the generator, distributer and magneto drive. The fan is a four-blade, aluminum casting, airplane propeller type. Either battery or magneto ignition may be employed with the engine. When magneto ignition is used, the magneto is mounted on a bracket to the rear of the generator and driven through the pump and generator shaft. When battery ignition is used, the distributer is driven by a vertical shaft just to the rear of the timing gear-case.

The engine is provided with standard S. A. E. bosses throughout. Its weight is 600 lbs. and length 42 9/16 in. from the front of the fan to the back of the bell housing. The height of the engine from the center of the crankshaft is 22 13/16 in.

Flexo Transmission Designed to Facilitate Gear Shifting

ELIMINATION of the conventional gearshift lever, better control of a car, impossibility of gear stripping and use of a secondary clutch by which the propeller shaft and gearbox are completely disconnected are among the features of the Flexo transmission, now being put into production. The device is the produce of the Flexo-Motive Corp., Chicago.

In place of the ordinary type of gearshift lever, an accessible steering column control is provided. Because of the possibility of operating under more advantageous gear conditions, increased fuel economy is also claimed.

Elimination of the gearshift lever is made possible by a secondary clutch within the gearbox itself by which the gearset is completely detached from the propeller shaft. The driver, consequently, makes all gear changes by giving a slight motion to a wheel or lever on the steering post, the mechanism being such that the rear or secondary clutch is automatically operated at such a time, so that all gear changes are made while the gears are relieved from load and relatively stationary.

Because the gearset is thus unloaded at both ends by the usual power transmitting clutch and by the secondary clutch in the gearbox, it is possible to shift from one gear to any other gear desired, either forward or back, without the use of brake or accelerator. It is claimed that any desired shift can be made instantly, irrespective of roads, load, grade or brake conditions, speed of motor, or the car speed or direction.

ROTARY CAMSHAFT CONTROLS SECONDARY CLUTCH

The gearshifting means also operates the secondary clutch. The device consists of a rotary camshaft, so timed that the gears do not begin to shift until the secondary clutch is entirely disengaged. After the gears are completely meshed, the rear clutch automatically re-engages. The device, therefore, is entirely mechanical in its operation, the shift being manual by the steering column control which can be a lever or wheel located beneath the steering wheel.

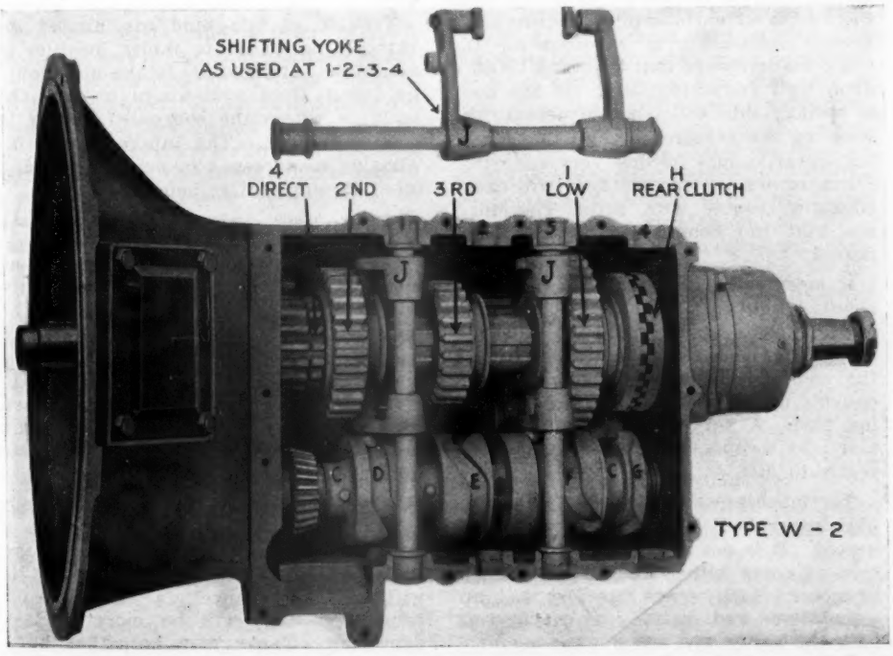
One of the important features claimed for the Flexo transmission gearset is the control of the car or truck afforded on steep grades or slippery roads, on account of the possibility of using the engine for a brake through the lower gears. Because of the unloading feature, it is possible to make this down-shift just as readily as an up-shift, and by using the engine for a brake, the differential acts as an equalizer and consequently overcomes the tendency to skid on slippery roads. It is also claimed that the use of the device makes it possible for gearshifts to be made with little loss of car momentum.

Ordinarily, it is necessary before making a shift from high gear to a lower speed in climbing a hill, to allow the speed of the car to decrease very noticeably. Experienced and expert drivers are able to make this down-shift at high speeds by speeding up the engine correspondingly before disengaging the clutch while the gearset is in neutral. However, this takes a range of skill which is far beyond the average driver. By the use of the secondary clutch, however, the change down is made on the Flexo transmission while the gears are stationary and unloaded and consequently no clash is experienced.

This transmissioin is provided in a three-speed type, and also in types from four to seven speeds. With the greater number of speed ranges, it is stated that a smaller engine operating in a narrower, more efficient revolutions per minute range can deliver the speed and power now offered only by heavier engines with a wider revolutions per minute range.

The seven-speed transmissioin is particularly recommended for trucks by the manufacturer, because of the great flexibility in the transmission to meet the needs of heavily loaded trucks in country where steep grades are frequent.

Referring to the illustration, the operation of the transmission is apparent. Through the operation of the shifting means on the steering wheel, a rotary motion is given to the camshaft C. On this shaft there are three slots D., E. and F, which actuate the gearshifting yoke J, and a notched cam, G. As shaft C rotates, the gearshifting yoke operated by cam G disengages the rear clutch H, thus completely unloading the transmission shaft from the rear driveshaft. As the camshaft C continues to rotate in either direction, any desired gear change, forward or back, is made. The cam G is so timed in relation to slots D, E and F, that the rear clutch H instantly re-engages after the gears are completely meshed.



Cut-away view of the Flexo transmission in which is incorporated a secondary clutch for the propeller shaft. The other view shows the steering wheel control

Installation and Care of Air Compressors

Firm Foundation Necessary
Locating the Compressor
Compressor Should Be Accessible
Short Pipes Save Air
Pipe Size Is Important
Where to Put Air Outlets

WHEN an air compressor is driven from a line shaft without a countershaft and the size of driving pulley is required, multiply the speed of the compressor by the diameter of its pulley and divide by the speed of the line shaft.

Example—An air compressor having a 9 in. pulley is to be driven at 350 r. p. m. from a line of shafting having a speed of 450 r. p. m. What size of pulley must be used on the line shaft?

350×9=3150÷450=7 in. Size of driving pulley in line shaft.

Self-contained compressor outfits may be of several types and it is doubtful if any of these has an advantage over the others insofar as efficiency or cost of operation is concerned. The three principal types are (a) belt driven; (b) silent chain drive; (c) gear driven.

FIRM FOUNDATION NECESSARY

The belt-driven type is generally very quiet in operation and for this reason may be used on a foundation that would otherwise act somewhat as a sounding-board and multiply the noise from another type to such an extent that it would be objectionable. The silent chain-driven type is very little, if any, noisier than the belt-driven and has the advantage that there are no belts to tighten, to lace or to replace, etc. Silent chains are easy to repair in case of accidental damage and are one of the most efficient types of drive to use.

The gear-driven type of machine is generally a little noisier than the other two, and it is almost impossible to eliminate all of the hum of the gears. This is due to the intermittent effort required of the motor. Some compressors are equipped with cloth gears and the noise of operation is thus considerably reduced. With a gearing of this type it is of the greatest importance to see that all oil is kept off the cloth wheels.

LOCATING THE COMPRESSOR

In ordering compressor outfits the maker will require certain data, such for example as the voltage of the motor, whether direct or alternating current; if alternating current, the number of cycles.

In locating the compressor it should be placed in as central a position as possible. This is to reduce to a minimum the length of various pipes required. No special foundation is required for the compressor except that it should be on a firm, well supported base. If the floor is springy this will tend to increase the wear on the compressor and the resulting vibration may become very annoying. Furthermore, the springy floor will cause constant trouble with belts. Therefore, see that the compressor is well supported.

It goes without saying that the outfit should be put in a clean, light place. Dirt is destructive. It clings to the radiating fins on the compressor and thus reduces the cooling efficiency. Furthermore, it collects in the bearings and other wearing parts. A very great deal of trouble given by compressors can be traced directly to dirt.

The machine should be cleaned at regular intervals if satisfaction is to be expected. It is not a wise plan to put any sort of cover either on the compressor or motor. Such covers interfere with air circulation and result in overheating both the motor and the pump.

The foundation for the compressor should be perfectly level. Otherwise there will be undue strain on the bearings and the oiling apparatus will very likely give trouble resulting in either under or over oiling.

COMPRESSOR SHOULD BE ACCESSIBLE

Never install a compressor in a cellar if this can be avoided. It should be entirely accessible and preferably should be somewhere in plain sight. If it is hidden away in the cellar or in some corner it is likely to be forgotten and like every other piece of machinery, it requires a certain amount of attention. Put it where it will receive attention. It should be accessible so that if adjustments become necessary from time to time they can be made quite easily.

The compressor should be located in such a way that there is no possible chance for gasoline fumes to be drawn into it. When air is compressed it is heated and the combination of heat, pressure, and gasoline fumes is all that is required to produce a first class explosion.

Trouble of this kind can almost invariably be traced to faulty location of air inlets. If possible, intake air should be taken from somewhere outside the building where the source of supply is cool and clean. The intake should invariably be screened to prevent dirt and other foreign matter being sucked in.

SHORT PIPES SAVE AIR

The storage tank should be placed as close to the compressor as conveniently possible. This is to reduce the loss of pressure due to long pipes and also to make necessary the fewest possible number of pipe joints. Pipes should run straight. Avoid right angle joints. Sharp changes in the direction of air piping increase friction and thus reduce air pressure.

Locate the tank so that it can be properly drained. There will always be a certain amount of condensation in the tank and unless this is drained off it will reduce the capacity of the tank and cause rust that will be more or less damaging. Tanks may be either horizontal or vertical; it makes little differ-

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ence if provision is made for proper drainage.

PIPE SIZE IS IMPORTANT

In making up compressed air pipe joints use shellac, asphaltum or a mixture of litharge and glycerine. Such joints will be tight. Make up all pipe joints very carefully and be positive that all leaks are removed. Leaks mean increased operating expense, and these should be located and cured before the compressor is worked in service and not after it has been used for several months. Air compressor output will depend as much upon the elimination of leaks as it does upon the size and capacity of the pump.

Never depart from the recommendations of the manufacturer with regard to the sizes of piping to use, as the maker's engineers have determined the proper diameters. The inlet piping should always be the full diameter of the inlet opening of the compressor. The same applies to the outlet piping. Use nothing but the best quality iron or steel piping. Brass is not necessary. The outlet pipe from the storage tank should be attached as high as possible from the tank so as to avoid condensed water or other foreign matter getting into tires.

The piping should be arranged in such a way that a trap or drain can be put at the lowest point to drain condensation in the pipes. This is particularly important where piping is run outside the building and where such condensation may freeze and thus render the outlets temporarily useless. A drain will avoid this trouble.

WHERE TO PUT AIR OUTLETS

Location of air outlets both inside and outside the service station should be given careful thought. As has been previously stated, outlets must not be put in such a place as to block entrances or exits and must be accessible to customers.

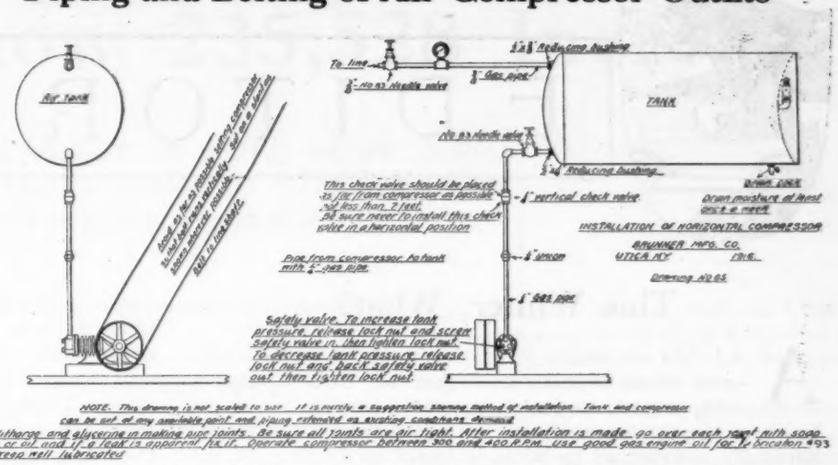
Outlets inside the service station should be put at the rim machine, where considerable mounting of tires is done, at the vulcanizer for use in inflating air bags, at the tube testing tank and also at the buffing machine for blowing dirt and buffings off the work. Other outlets should be put where convenience or necessity indicates, but their number should be limited as much as possible.

Experience has indicated that connections to these outlets is best made with a woven fabric covered hose of comparatively small diameter. Such hose is far more flexible than rubber hose and thus is easier to handle and will last longer. Rubber hose is likely to become porous.

CARE OF COMPRESSORS

There is nothing very complicated or mysterious about an air compressor. It is nothing more than a kind of gasoline engine insofar as its parts are concerned, though the operation, of course, is entirely different. As the piston goes down air is sucked in through the intake valve, and as the piston rises this valve closes and the compressed air is forced through

Piping and Belting of Air Compressor Outfits


Air tank
To line
Gas pipe
TANK
Reducing bushing
Drain cock
Drain moisture at least once a week
vertical check valve
This check valve should be placed as near from compressor as possible, not less than 2 feet. Be sure never to install this check valve in a horizontal position
INSTALLATION OF HORIZONTAL COMPRESSOR
BRUNNER MFG. CO.
UTICA, N.Y.
Drawing No 65
Pipe from compressor to tank with ¾" pipe size
Union
Safety valve. To increase tank pressure release lock nut and screw safety valve in, then tighten lock nut. To decrease tank pressure release lock nut and back safety valve out then tighten lock nut.
NOTE. This drawing is not scaled to size. It is merely a suggestion showing method of installation. Tank and compressor can be set at any available point and piping extended as existing conditions demand
use litharge and glycerine in making pipe joints. Be sure all joints are air tight. After installation is made go over each joint with soap suds or oil and if a leak is apparent fix it. Operate compressor between 300 and 400 R.P.M. Use good gas engine oil for lubrication and keep well lubricated

Where the compressor is driven by belt from a line shaft the piping and belting should be arranged as shown in this illustration. The drawing is not scaled to size and is merely a suggestion showing the proper method of illustration

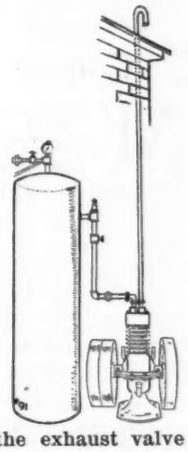


Fig. 91. If possible, intake air should be taken from somewhere outside the building where the source of supply is cool and clean

the exhaust valve and along the pipes to the storage tank.

Obviously, unless the valves are in good condition and are operating properly, the capacity of the compressor will not be up to normal. These valves are of the poppet type and are just like the valves in an automobile. Like them, they require grinding from time to time. Unlike them, however, they must be ground far more carefully. A seat that may be good in an automobile engine valve may not be nearly good enough in an air compressor. Valves must be ground with the very finest grade of grinding compound and brought to a perfect seat if leaks are to be avoided.

Definite instructions regarding lubrication of compressors are given by the manufacturer and should be followed very closely. Compressors require oil only at comparatively long intervals. Lack of oil will cause burned-out bearings just as it will in an automobile engine. Too much oil will be disastrous in that it will gum the rings and make it necessary to re-grind the valves at frequent intervals. Furthermore, the oil will get into the storage tank and thence into tires, to say nothing of rotting the rubber hose at the service station outlets. Use enough oil but not too much.

Keep all nuts and bolts about the compressor drawn-up snugly. Loose cylinder head bolts reduce the capacity of the compressor by permitting air leaks. After a compressor has been used for a short time cylinder head bolts should be drawn up. Do not go around the head tightening each one in succession. Instead, draw up opposite bolts until all are tight. If it should be necessary to replace a cylinder head gasket, nothing but material supplied by the manufacturer should be used. Paper or rubber composition gaskets will not hold compression. Paper blows out easily and the rubber composition deteriorates rapidly because of heat and the small amount of oil that gets on it.

A knock in a compressor may be caused by a loose flywheel, dirt or carbon on top of the piston, thin gaskets which allow the piston to touch the safety-plate, worn piston pin or connecting rod bearings, worn crank-shaft bearings, etc. These various troubles are not difficult to locate and the remedy is always suggested by the trouble itself.

In next week's article Mr. McMinn will cover the following points: the service car and its equipment; a movable service station; size of truck; best type of body. In future articles he will discuss: Damp Cellars Are Objectionable; Artificial Light Is Unsatisfactory; Upstairs Location Is Preferable; Get Good Light and Air; Separating Shop and Store.

STAN PAR AGAIN MONEY MAKER

Cleveland, July 22—The Standard Parts Co., a $20,000,000 corporation making automobile parts and accesories, which has been in the hands of a receiver since last September has been making money in the last two months.

John Younger, who is in direct charge of operations for Receiver Frank A. Scott, one of Cleveland's most successful business men, says that the company's showing is proof that the automobile industry is healthy and business is good. The Standard Parts in recent months has obtained considerable new business and has taken on some big contracts from concerns that are operating at capacity and are rushed with orders. The gross revenues have lately been running approximately $1,000,000 a month.

EDITORIAL

This Winter, What?

AS LONG as many of the country's statisticians and other experts hold that we cannot reasonably expect to see a material clearing up in the business stagnation until next spring, there are those who naturally wonder as to what is likely to become of the dealers in some of the smaller towns.

Where dealers are dependent chiefly on a farming community, it is fairly safe to say there will be little business of an encouraging nature done this winter. There will be some sales, of course, and there will be some repair work. In fact, it probably will be the latter on which many of the dealers will have to depend to carry them through.

Some of the small town dealers must not be afraid to do things this winter they never have done before when business was dull. Overhead must be cut to the minimum figure. If necessary, the place of business must be divided off and only enough space used to comfortably handle the business.

We know of one dealer, for instance. who this winter is going to use a part of his salesroom for service work. He is going to partition this room for his salesroom, service and repair department, office, etc. He figures it useless to heat the entire building, and useless to have the salesroom space idle in winter, when farmers come to town perhaps only once a week. It will be better for him to use his salesroom for whatever repair business he has, at the expense of redecorating in the spring. It will cost him less than heating the whole building.

We know of another dealer who is going to turn over part of his building for storage room for potatoes and other products. Surely this is a procedure very foreign to automotive work, but it is going to tide him over, together with whatever revenue he makes from his regular business.

Perhaps many of the automotive buildings throughout the country have been built overly large. What is the result? Large overhead, vacant space, and a general atmosphere of not being busy. Not long ago a dealer stated that there are two things some of the dealers in the smaller towns must do before long—and maybe this statement applies to some of the dealers in the big cities as well. He said the time is coming when they will either have to lease some of the space in their buildings or take on another line of business to handle in addition to the automotive line.

In last week's issue of MOTOR AGE there was a discussion on the question of whether or not service was getting away from the dealer. In this it was pointed out that much of the work formerly done by dealers now is going to institutions specializing in such work as electric, tires, batteries, filling stations, etc. Along this line it is interesting to note what has taken place in a small town of the middle west.

There are four garages and service stations in this town. All of them, heretofore, sold gasoline and oil. One of these places often sold as many as 1500 gallons of gasoline on a Sunday. At four cents on the gallon this made a good profit on this item. Now one of the large oil companies has installed a filling station and the four other institutions find themselves literally out of the running. What fuel and oil they might have sold this winter will be lost to them and they must turn their attention to other sources of revenue.

County Fairs and Automobiles

MERCHANDISING in all large centers of population is impersonal because of the diversified, mixed population and by the very nature of things. This condition is not true of selling in rural districts where personality is the big thing and the qualities in the dealer's "Howdy John" are known from one end of his territory to the other. If the friendliness in the salutation is of hearty and enduring quality, uniform from meeting to meeting, and unbound by conventions, it is a most valuable asset; if, on the other hand, these qualities are lacking and the nature of greeting is in doubt, then it is a liability and leads to ruin.

Friendliness is the unbreakable bond that holds rural communities together, and the COUNTY FAIR is the one place and one time for cultivating friendly acquaintances which lead straight to and almost name the volume of the year's business.

Do automobile dealers, located in small towns, pay enough attention to the friendly association, with business at both ends and all through the middle, which the county fair makes possible? Here you are pretty sure to see all your old friends from the other end of the county. They have brought new friends with them and if you are a good mixer if you are inclined to be on friendly terms with your potential market before the fair is over you have met under the most favorable circumstances just about everybody in the county.

It is good advise when MOTOR AGE says to its dealers: "Go to the fair; buy little balloons, taffy, popcorn; be a prominent figure in the big neighborhood merry-go-round—and sell automobiles."

There is specific value to the automobile dealer in every county fair. Space for exhibition purposes is sold cheaply, and large attendance, because of the well established popularity of the fairs, is assured if not guaranteed. The well-kept and always popular race track is a drawing card that brings hundreds of automobile folks. Machinery Hall with its complete displays of farming implements is another attraction that should be used to the utmost by the automobile dealer. He should be a part of every fair—the big thing during the week of fun and friendly frolic.

25 States Show 235,528 Increase

Total Registration in Forty-seven States for Year 1921 Is Given as 8,776,533; New York Not Included

AKRON, July 25—Complete automobile registration figures for 1921, collected from forty-seven states by the Akron Chamber of Commerce, show an increase of 235,528 in the number of machines. The only state not included in the 1921 registration is New York. The forty-seven states which in 1920 reported registration of 8,541,005 motor vehicles report a total registration of 8,776,533 for 1921. These figures are compiled from official reports from the various secretaries of state.

Registrations in New York are shown to be running heavier than in 1920, according to John J. Lyons, secretary of state.

Of the 47 states reporting, 22 show decreases from the previous year. States showing decreases are Arizona, Arkansas, Colorado, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Utah and Washington.

Ohio has the second largest number of motor vehicles registered according to the tabulation, with 677,000, being second to New York.

Nevada, which in 1920 footed the list with only 10,464 motor vehicles registered, shows a still further decrease in registration this year, reporting only 9,882.

Pennsylvania leads all states in respect to increase, showing 60,861 more registrations this year than in 1920. Ohio stands second in respect of increase, with 55,160 more vehicles registered this year. Massachusetts ranks third, with an increase of 37,249. California is fourth with an increase of 35,132 and Illinois fifth with an increase of 18,664.

The Akron Chamber of Commerce tabulation of motor vehicles registrations in 1920 and 1921 from 47 states is:

	1921	1920
Alabama	77,076	74,637
Arizona	31,551*	34,601
Arkansas	58,700*	59,082
California	604,024	568,892
Colorado	121 502*	129,255
Connecticut	122,695	119,134
Delaware	19,400	18 300
District of Columbia	55,000	34,161
Florida	90,829	73,914
Georgia	118,573*	146,000
Idaho	46,730*	50 861
Illinois	587,588	568,924
Indiana	351,297	333,067
Iowa	433.000*	437,378
Kansas	265,558*	294,159
Kentucky	108.668*	112,683
Louisiana	70,000	73,000
Maine	67,341	62,807
Maryland	122,550	102,841
Massachusetts	311,747	274,498
Michigan	432,126	412,717
Minnesota	324,166†	324,166
Mississippi	54,114*	68,486
Missouri	308,883	297,008
Montana	51,873*	60,650
Nebraska	213,350*	219,000
Nevada	9,822*	10,464
New Hampshire	39,064	34,680
New Jersey	245,634	227,737
New Mexico	20,450*	22,100
New York	.....	670,290
North Carolina	149,444	140,860
North Dakota	86,986*	90,840
Ohio	677,000	621,390
Oklahoma	180,000*	212,880
Oregon	102,274*	103,790
Pennsylvania	631,025	570,164
Rhode Island	48,098*	50,477
South Carolina	85,272*	93,843
South Dakota	113,700*	120,395
Tennessee	102,800	101,852
Texas	444,541	427,693
Utah	41,945*	42,616
Vermont	33,601	31,625
Virginia	132,300	115,470
Washington	170,470*	173,920
West Virginia	85,916	80,664
Wisconsin	297,850	293,298
Wyoming	30,000	23,926

*Decrease.
†Registration starts in May.

Service on Wheels Profitable

BERKELEY, Calif., July 23—T. P. Stevick and Brooks Walker, students in the University of California, have equipped a 1914 Stutz with windlass and jacks, tools and repair parts for small cars, and taken to the road through the Yosemite, as a traveling repair shop, making their headquarters on the troublesome Chowchilla grade, near Wawona. The plan was suggested by Stevick's having seen many motor tourists in trouble on these roads, and has proved profitable.

LOUISVILLE DEALERS OPTIMISTIC

Louisville, July 18—As the season progresses, automobile sales are increasing rather than falling off, according to opinions of leading automobile dealers here.

The number of new purchasers of new cars is steadily increasing. This is particularly encouraging to the dealers. Price reductions, which have been made on practically every make of automobile sold in Louisville, have stabilized the market and created a new demand for automobiles.

On high priced cars, business, while apparently slow, is shown by a comparison with the last five years, to be normal for this season of the year.

The statements of some of Louisville's largest distributors follows:

Prince Wells, Prince Wells Co., Nash dealer—"There is a bigger demand for new cars now than for a long time past. The same general demand for new cars is reflected in towns out in the state. Where indications of good crops are in evidence, the dealers all report a healthy demand for automobiles. We do not expect to be up on our orders for 60 days."

W. A. Thomas, Thomas Garage, Grant dealer—"I am very optimistic over the outlook of the automobile business. Up to a few weeks ago it was a rarity to talk to anyone interested in the buying of automobiles, but since then prospects are coming in frequently. I just made a trip through a portion of the Kentucky territory, and while I found business slow, the dealers were optimistic over the prospects for the fall business. Salesmen must be salesmen instead of order takers."

C. L. Alderson, Standard Auto Co., Cadillac dealer—"During the hot summer months there has always been a curtailment in buying and this year is no different from other years. The automobile business at the present time is normal for this season of the year."

Clifford Bowman, Hite D. Bowman Co., Chalmers and Pierce-Arrow dealer—"Business has been picking up for the last 30 days. The most noticeable thing about this increase is the fact that there are more new buyers of cars than I have seen in a long time. I mean by this that more buyers are coming in who have never owned an automobile before, and thus have no used car to trade in. This is an encouraging sign not only for the automobile business, but is an indication of returning confidence generally."

L. J. Hannah, Southern Motors Co., Dodge dealer—"Our books show that we have done a greater business during June and the first half of July than during a similar period for the last four years."

William O. Protsman, Leyman Motor Co., Buick dealer—"Our June business was highly satisfactory, not only in volume, but in character. The buyers were as a class conservative and the number of time-payment sales were below the normal average. It has so continued into July, and many new prospects have entered the market."

Georgia Dealers Band to Fight Ruinous Taxation

Pending Legislation, If Enacted, Will Cause Dealers to Go Out of Business

ATLANTA, Ga., July 23.—Volney Williams, president of the Georgia Automotive Dealers' Assn., appearing before the house committee on appropriations and ways and means of the Georgia State Legislature, now in session, told members of the committee that the tax increases proposed by the present assembly on automobile and accessory classifications are too high, and that if the present taxes are increased to any appreciable degree it will have the effect of putting a large number of dealers in Georgia out of business within the next year.

Taxes Proposed are Obnoxious

As a matter of truth, the taxes proposed by the present legislature are obnoxious, especially considering the fact that the automobile industry in this state, at least, is already carrying a tax burden heavier than it can well afford at this time. Within the past year hundreds of dealers throughout the state have failed or gone out of business, and while much of this was due to the long period of depression, the heavy tax burden has had considerable to do with it. Georgia dealers are this year cooperating more determinedly than ever to defeat the passage of additional tax measures.

A bill revising the general tax act in the state so as to produce an estimated increase of $500,000 a year to the state revenue beginning Jan. 1, 1922, has already been introduced before the general assembly. Wholesale and retail dealers in automobile tires and accessories are placed in separate classes in this bill, wholesalers being taxed $250 a year and retailers $25 a year. There are other proposed forms of taxation in the bill that will have a serious effect on the automobile industry in this state if it is passed. The bill providing for a tax of one cent per gallon on gasoline appears to be a certainty regardless of the efforts that have been made to defeat it.

USED CARS SHOW IN NEW ORLEANS

New Orleans, July 23—Automobile dealers of New Orleans are still seeking a solution of the used-car situation. The committee of the dealers' association appointed about a month ago has not yet made any definite recommendations, although the secretary is busy compiling data from the various dealers, showing the makes, styles, models, etc., of the used cars on hand.

When this data is completed, it is expected that the committee will agree upon some definite plan to be submitted to the association. Meanwhile, a number of dealers have been conducting special sales of used cars, offering novel inducements to prospective buyers, such as supplying an expert driver until the buyer becomes proficient in driving.

Another sale was conducted upon an open lot near the business center of the city. Cars were contributed by a number of dealers and the sale was conducted for several days during the latter part of July.

Is "Floorwalker" for Automobile Row

BIRMINGHAM, July 25.—Sam Bordorph, partner in the firm of Scholder Tire Co., has been appointed official "floorwalker" of automobile row. It is his business to take care of automobile owners who are not familiar with the locations and accommodations on the row.

There are hundreds of owners, who, when they need something go to Mr. Bordorph. He in turn takes them to all of the shops, never leaving them until they are "sold and satisfied," as he expresses it.

Sherman, Executive Editor Class Journals, Resigns

New York, July 25—Ray W. Sherman, executive editor of the Class Journal Co., has resigned to become merchandising director of the Automotive Equipment Assn.

Mr. Sherman will take up his new work August 1, organizing and directing the sales promotion movement authorized at the recent Mackinac Island convention of the A. E. A. His headquarters will be in Chicago, where he will work with the sales promotion committee headed by Robert A. Stranahan, president of the association.

Before becoming executive editor of the Class Journal papers Mr. Sherman was editor of Motor World, which he joined more than nine years ago. Previously he had spent several years in daily newspaper work and for a time was in the advertising department of the Franklin Automobile Co. He was graduated from Syracuse University in 1907.

The work which Mr. Sherman will undertake, with a staff of assistants, is virtually an educational campaign intended to carry a practical message of better merchandising to all branches of the automotive equipment trade. It will call for the cooperation of manufacturers, jobbers and dealers in plans yet to be worked out in detail.

LARRABEE REDUCES PRICES

Binghamton, N. Y., July 25.—The Larrabee-Deyo Motor Truck Co., Inc., announces reductions of $200 and $300 on its models. The 2½-ton is reduced from $3,400 to $3,200, the 3½-ton from $4,200 to $4,000, and the 5-ton from $5,100 to $4,800.

Tire Orders from Dealers Are Heaviest in History

Automobile Manufacturers Also Are Back in Market as Strong Buying Factors

AKRON, July 25—All rubber companies here report steadily increasing sales. Dealers' orders are heavier than at any time in the history of the tire industry, while automobile manufacturers again are increasing their original equipment tire specifications and have indicated that they expect the automobile manufacturing business to continue steadily without any further setback.

Goodyear, with dealer sales of 73,000 separate units, has increased tire production to 25,140 casings and 30,000 tubes at Akron, and 3,500 casings and 3,500 tubes at California, giving the company over 90 per cent of peak production. The Goodyear mechanical goods departments showed an increase in June of 19 per cent over May. These departments are now running 60 per cent of last year's peak production, with the heaviest increases being reported in sales of belting, packing and hose. Truck tire sales increased 18 per cent in June over May.

Firestone has increased production to 23,000 casings and 25,000 tubes daily, as compared to a peak of 28,800 tire units daily, obtained early in 1920 before the tire industry entered the period of depression.

DUESENBERG DELIVERIES SEPT. 1

Indianapolis, July 23.—Deliveries to dealers established in all parts of the country will be begun Sept. 1 by the Duesenberg Automobile & Motor Co., Inc. Orders for more than 3,000 cars which will cost in excess of $12,000,000 now are on the books.

Factory production will be in charge of A. W. King, formerly production manager for the Buick Motor Co. and the Northway Motors Co., who recently returned from France, where he reorganized the production system of the Berliet company.

The sales organization is being perfected by Harry W. Anderson, who has served as sales manager for Stutz, Templar and the Buda Co.

CREDIT CONDITIONS IMPROVE

Indianapolis, July 22—Credit conditions are improving materially, according to executives of the various automobile financing organizations of this city. Collections in every one of the companies now are approaching the 100 per cent mark, improvements being shown each week. Three months ago, officials say, collections were very difficult. They say that car owners who had purchased on payments said in many cases that they did not have the money. Where investigations justified it, the companies carried the owners. Now the delinquents are coming in, making their regular payments and catching up on the back payments.

Makes Plea to Governor to Save Millions for Roads

California Motorists Up in Arms Because of Alleged Waste in Highway Construction

SAN FRANCISCO, July 23—Charges of extravagant management of highways, and waste in their construction, upkeep and management, are laid before Governor William D. Stephens, in an open letter signed by George S. Forderer, San Francisco, president of the California State Automobile Assn. The letter summarizes conditions as revealed in ten articles on the subject previously compiled, and adds:

"The remedy for these conditions lies within the scope of the powers entrusted to you as governor of California, and it is our hope that your complete investigation of these conditions will lead to their correction, before tremendous additional waste is added to the burden of highway costs in the expenditure of the remaining highway funds."

Favor State Assn. Highway Policies

The letter reveals the fact that the Automobile Club of Southern California, which has more than 50,000 active members, has taken a referendum of its members, with the result that 99.77 per cent voted in favor of the highway policies of the state automobile association. The attention of the governor is especially called to the fact that "the persistence in a policy of following the day-labor method of construction totaling an expenditure of more than $10,000,000, to June 30, 1921, has resulted in costs far in excess of contract work, averaging between 25 per cent and 30 per cent more, and it is estimated that the loss to the state by this policy has amounted to between $2,500,000 and $3,000,000. The gravity of this entire question affecting the conservation and economical expenditure of funds at hand, and the funds that may be made available in the future, should impress you (the governor) with the need for a serious review and consideration of proper remedial action."

After discussing the loss due to the day-labor policy, the letter summarizes the findings of a committee of engineers employed to investigate the condition of the highways of the state as follows:

"The continuation of building thin, narrow pavements on adverse subsoil until the latter part of 1920, after repeated failures of the same in 1914, 1915 and 1916, has resulted in an enormous loss of highway funds. This loss is clearly proven by the estimate prepared by the highway commission in April last, showing the need for reconstruction of 290 miles of thin-slab pavements, 125 miles of which had been built since 1916, and 39 miles of which has given less than three years' service.

"Engineering, overhead and supervision charges incurred by the California State Highway Commission exceed the average of seven western states by 6¾ per cent and this excess amounts to more than $2,800,000 in the total amount of work performed to June 30, 1920. The continuation of such extravagance of administration will result in additional waste of more than $3,800,000 of the $57,000,000 of highway funds available for expenditure during the next four years.

"The written agreement entered into between the highway commission and officials of the two automobile associations as a result of the conference held in Sacramento on April 12, 1921, pledging cooperation and the working out of the entire problem, was almost immediately thereafter violated by the Highway Commission, and all overtures of the Automobile Association to carry out the terms of this agreement were turned aside with scanty or no consideration.

Publishing Series of Articles

This agreement became, in fact, another 'scrap of paper.' Our letter of May 13 to you stated these facts, and, as an example of the cooperative spirit animating the Highway Commission, we quote from a newspaper letter by Highway Commissioner Whitmore, as follows:

"'It is time these automobile clubs, these wolves in sheep's clothing, were unmasked and obliged to stay within their proper province.' * * *"

"The Automobile Club of Southern California is now engaged in publishing a similar series of articles, giving to the people of the state the facts and figures concerning highway management in California. The gravity of this entire question affecting the conservation and economical expendfture of the funds in hand and the funds that may be available in the future should impress you with the need for a serious review and consideration of proper remedial action."

DENVER FESTIVAL AUG. 10

Denver, July 16—The Denver Automobile Dealers Assn. on Aug. 10 to 12 inclusive will give a mid-summer festival of motor cars, trucks and motor camping equipment. The exposition will be held in the Civic Center.

Creditors Accept Mercer Motors Refinancing Plan

Bond Issue of $500,000 Has Been Sold, Proceeds to Be Used as Working Capital

NEW YORK, July 23—After months of laborious effort the committees representing bank and merchandise creditors have solved a satisfactory plan for the reorganization of the Mercer Motor Co. This plan has been accepted by the representatives of both classes of creditors.

As a preliminary it calls for an agreement with the officers and directors of Hare's Motors, the selling organization, for the cancellation of all contracts and options. The committees have expressed formally their appreciation of the helpful attitude of Hare's Motors and it is recognized that general conditions rather than lack of ability on the part of the executives were responsible for the difficulties of Mercer.

Purchasers have been found for $500,000 of first mortgage bonds, which will provide working capital, contingent upon the issuance of $2,000,000 in sinking fund collateral notes bearing 7 per cent interest, which both bank and merchandise creditors would be expected to accept for 80 per cent of their claims. If the creditors agree to this proposal they will be paid 20 per cent of their claims on August 1 or as soon thereafter as possible and an additional 5 per cent before December 31. The notes would be secured by the assets of the Simplex Automobile Co., Inc., and 50 per cent of the next earnings of the Mercer company would be paid over to a trustee for the benefit of creditors.

The purchasers of the bonds would insist upon the resignation of all the present officers and directors and the right to elect a new board as well as a release from the contract with Hare's motors.

A letter will be sent this week to bank and merchandise creditors of Locomobile asking them for an extension of time, probably six months.

Winners of the French Grand Prix

Year	Dis. Miles	Car	Driver	Nation	M.P.H.
1906	774*	Renault	Szisz	France	63.35
1907	478.3	Fiat	Nazarro	Italy	70.61
1908	478	Mercedes	Lautenschlager	Germany	69.5
1912†	956	Peugeot	Boillot	France	68.07
1913‡	569	Peugeot	Boillot	France	72.03
1914	467.6	Mercedes	Lautenschlager	Germany	65.50
1921	321.78	Duesenberg	Murphy	U. S.	.....

*Two-day race, 387 miles per day.

†Two-day race, 478 miles per day.

‡Fuel consumption race, cars limited to 1 gallon of gasoline for each 14.1 miles.

Northwest Discounts June Sales to Save License Fee

July Gets Credit for Large Part of 4,200 Registrations, Many of Which Belong to June

PORTLAND, ORE., July 22.—Although sales of new automobiles throughout Oregon seemed disappointingly few during the month of June, as judged by the number of new cars registered with the secretary of state, business was in reality good or excellent in practically all lines. The secret of the situation was that large numbers of purchasers in all parts of the state, who ordered cars, waited until July 1 or later to take delivery. Under the state automobile license law the full year's fee must be paid for all licenses secured during the first six months, while on and after July 1 the fee is but half.

Registrations during the month of June totaled 2,115. This included 800 new passenger car licenses and 84 new truck licenses. The rest were seconds and transfers. This seemed to be but one-third normal and indicated that Oregon had suffered a considerable slump in selling.

July Unusually Heavy Month.

However, during the first week of July there was a total of 4,200 registrations, or nearly twice as many for that one week as for the entire month of June. This situation will show July as an unusually heavy month and June as a lean one, although much of the business shown under July registrations was actually secured in June.

In one Portland agency, according to Ralph J. Steahli, secretary of the Portland Automobile Dealers' Assn., two floors were packed solid with cars sold but undelivered. The purchasers were waiting until after the first of July to take delivery in order to escape the excessive license fees.

While the June figures are thus in a way deceiving, as indicating the total volume of business, they give an interesting basis for comparison of the business of the various cars. The light cars are well in the lead, after elimination of Fords. Of the total of 800 new cars registered during the month, 402 were Fords. Other leaders were Chevrolet 89, Dodge Brothers' 70, Overland 55, Studebaker 30, Hupmobile 17, Essex 16, Oldsmobile 15, Hudson 10 and Maxwell 10. Buick undoubtedly was well among the leaders but under the license arrangement provided by the Buick dealer here their registrations are not included.

HOOSIERS BUYING CORDS

Indianapolis, July 22.—Semi-annual inventories show the tire business as a whole to be showing up well when compared to the same period of last year. The showing is from a dollars and cents standpoint, and not in tires sold. The larger dealers here say that if a normal increase is made during the last six months of the year, the year as a whole will be nearly equal to 1920.

The number of tires is lower by comparison than the dollars and cents business. Reductions in price this year are given as the cause for this, which fact may seem paradoxical. Dealers say that with the reductions, hundreds of automobile users, who always before purchased fabric tires, now are buying cords because they now are able to buy cords at a very little more than they formerly paid for fabrics.

Legal War for Tax Return Starts in North Carolina

Raleigh, N. C., July 22.—State Treasurer B. R. Lacy has formally declined to make any refund of automobile license taxes paid to the state by automobile manufacturers or their representatives in the state. J. S. Griffin, a Raleigh attorney, representing the Olds Motor Works, the Kissel Motor Car Co., the Cole Motor Car Co., and the Marmon Motor Car Co., had made formal demand on the treasurer for a total refund of $6,000, representing sums paid in by his clients in compliance with the state law. Invalidity of the revenue act, so declared by the United States supreme court, because of discrimination in favor of North Carolina corporations is the reason assigned for the demand.

It is understood that the attorney general has advised the treasurer not to pay back any taxes, even those paid under protest, and that suit will be instituted for the recovery of approximately $265,000.

NEW ORLEANS TO HAVE RACE

New Orleans, July 23.—Five hundred dollars will be the first prize to be offered in the main event of the amateur automobile races which will be staked at the fair grounds here Sept. 18. The event will be a 50-mile race, free for all. Anyone who owns an automobile can enter this race, but big cars must be stripped. The second prize will be $200 and the third $100.

In the race for women drivers the first prize will be $100, the second prize $50 and the third $25. Any car driven by a women may be entered.

OHIO REGISTRATIONS MOUNT

Columbus, O., July 22.—According to mid-year estimate by W. A. Snow, Ohio registrar of automobiles, a total of 651,351 registrations was made during the first six months of the present year. Of that number it is estimated that 12,650 were transfers; 547,013 were passenger cars; 76,303 were motor trucks and 11,661 were motorcycles.

It is estimated that there will be in excess of 600,000 passenger cars registered in the Buckeye state, while the number of trucks will be about 85,000. Motorcycles are expected to reach 18,000 and the receipts to be in excess of $6,500,000.

To Force Actual Business Nearer Potential Sales

$10 in Additional Sales Would Add $100,000,000 Annually to Dealers' Business

TOLEDO, July 23—At the meeting of all the salesmen of the Champion Spark Plug Co., held here last week it was shown that the automotive equipment industry is running at good speed now but that a greater market must be developed for the future.

President R. A. Stranahan, addressing the salesmen declared that his company was up to last year's business but that it had to increase output.

"We must get our actual business nearer to our potential," he said. "If every dealer in the country would sell $10 worth of additional equipment a year to each motorist that would increase the business of the country $100,000,000 annually. Each could get his share without taking any business away from competitors. It means that we could expand our business greatly."

Among the speakers at the meeting were F. B. Caswell, sales director, who looks to an immense purchasing power to be released this fall when crops are harvested and marketed, and Harry G. Mooch, manager of the National Automobile Dealers' Assn., who said the time had come to "stop kidding ourselves."

"We are past the 'game' stage in the automobile business," he declared. "We must win the respect and confidence of the buying public and prove that we are a permanent industry dealing in a commodity which is long past the luxury stage.

"The legislators have tried to hang this tail of luxury onto us but the power of votes back home have told them they can not do it. There is a silent partner now taking out 35 per cent of the revenue of the industry. It is all right to pay our fair share of taxation but we have been so busy running our own businesses that we have sent men to Washington and put in their hands the power to destroy us without so much as looking over their qualifications.

"We do not know whether our taxes will be increased or decreased. We want justice in that line and it is to our interest to be unified in our demand.

"Legislation always has to be watched. Just now we are trying to put across the Townsend bill. It must go over or there will be no more Federal aid for highways. It is to remove the pork barrel methods. We have spent millions for highways, but in Indiana, for instance, there is only one mile of Federal aid road.

"Traffic in city and country does concern you men and dealers because people who have to ride over rough and muddy roads will not buy cars.

"Time was never so bad that business could not be had. Every man is potentially an automobile owner. Let us do some real merchandising, departmentalizing, specializing and economizing."

Car Demand Continues to Increase in Central Ohio

Dealers Won to Plan of Hard Work; Trucks of Light Draft Beginning to Move

COLUMBUS, July 23—There is a continued improvement in the demand for passenger cars in Columbus and central Ohio territory. This is the report from dealers and distributors in almost every line. With a number of price reductions announced during July, business in certain makes was still further stimulated. On the whole, trade is much better than was expected.

There is a slight improvement in the employment situation which is shown by the reports of employment agencies and also by reports received from large employers of labor. Some of the plants that were closed down early in the year are gradually resuming and are employing more men from time to time. The other concerns are holding their own and as a result fewer men are out of work now than was the case a month or six weeks ago. This is being reflected in the automobile trade, especially passenger car.

Dealers and distributors are proceeding cautiously. The larger majority believes that the improvement will be gradual and does not expect a boom during the present year. These dealers are working on the principle that many cars will be sold and it is up to the dealer to hustle for the business. Consequently, salesmen are being trained to pick up prospects and to handle the prospects after they are secured. It is a long hard grind ahead of the sales force and special efforts are being made to keep up as much as possible.

Truck business, especially for heavier vehicles, is still quiet. This is due to the fact that haulage companies are fairly well supplied with transportation facilities in the present shrinkage of business. Wholesale concerns, manufacturers and merchants generally are not inclined to increase their heavy equipment under present conditions. But there is a gradual expanding market for light trucks, mostly of the delivery type. These trucks are selling fairly well and prospects are rather bright.

The repair business is holding up fairly well in spite of business depression. Most of the larger shops in the downtown section are full of work and service stations attached to agencies are also fairly active. The smaller shops in the outskirts are the ones which are feeling the depression.

JULY BETTER THAN AVERAGE

Cleveland, July 25—Basing their estimates on the volume of business done the first two weeks of July, representative Cleveland dealers assert the present month will be from 25 to 30 per cent better than the average July in the past from a business standpoint.

Reductions in prices brought an influx of new business that has continued through the middle of the present month in this city. Many owners and others wanting to own a car this year kept holding off for lower prices, until now dealers say the demand indicates that the average buyer is of the opinion that the last price reductions on 1921 cars have been made.

Chandler cars and June sales went up surprisingly with the first two weeks in July, far ahead, from the standpoint of new cars delivered, of the corresponding period in 1920.

The Jordan dealer, who says that his June sales were the best for any similar month in the history of his firm, asserts that July this year is likely to establish a new record.

Reports at the Dodge, Chevrolet, Willys-Knight, Overland, Studebaker, Auburn, Franklin, Hudson and Essex, Stutz and Buick agencies are that July this year is better than the average.

The statement of the Cleveland Trust Co., is interesting in this regard. It says that business cycles pass through four separate phases—prosperity, forced production, liquidation and readjustment back to better times. We are now in the third and fourth phases, and while liquidation is not entirely completed, readjustment is under way. When prices are falling, the tendency is to get rid of stocks on hand. During this transition industry stagnates, unemployment is general and business is bad, because everybody wants to sell and few want to buy. Such a situation always corrects itself because consumption is greater than production and stocks become exhausted and have to be replenished. Evidence is accumulating that the rapid fall of wholesale prices has stopped.

At the Paige-Ohio agency here, it was stated that the automobile retail trade is holding up because the public is convinced that liquidation is at an end.

He's Coming In; Swat 'im

NEW YORK, July 22—Passenger car dealers have had experience lately with a new variety of automobile shopper. This person who does not own a car and so would have none to trade, goes around to a second hand dealer and gets the loan of a used car and a statement of the price for which he can buy it. He then takes the used car and goes shopping around to new car salesrooms doing his best to trade it in for a new car at an allowance which will give him a considerable margin over the used car price fixed by the used car dealer.

This custom which has become quite prevalent and which is depriving dealers of the few remaining prospects who made "clean" purchases, has had quite a demoralizing effect on retail sales conditions as a number of dealers have gone into the business of overbidding each other on an allowance for the used car.

N. A. C. C. Lays Down Law On Automobile Insurance Evils

Threatens Underwriters With Mutual Companies Unless Conditions Are Complied With

NEW YORK, July 25—Vigorous protest against evils which have grown up in the automobile industry has been made by the insurance committee of the National Automobile Chamber of Commerce, headed by Wm. E. Metzger, to the Automobile Underwriters' Assn. The underwriters were told flatly that unless they took adequate steps to remedy these evils mutual companies would be formed in all parts of the country to take over the automobile business. Companies of this nature are already operated by the Automobile Club of America and by the Chicago Motor Club.

The N. A. C. C. committee has attempted for some time to cooperate with the underwriters but has found that the cooperation on the part of insurance companies has consisted in counting up their losses for the previous year and doubling the rates. It is contended that the companies do not take the moral hazard into account in writing insurance and will give a notorious crook the same rate that is granted to a reputable business man.

Another evil of which complaint is made is over-valuation. Cars are now insured for such amounts that it is almost an incentive to destroy them.

Serious objections were also raised to the demand of the underwriters' laboratories, Chicago, maintained by the insurance companies, that all materials which go into the manufacture of motor cars must be approved by the laboratories under penalty of being subjected to a higher rate.

PLAN SALES AND SERVICE CHAIN

Milwaukee, July 22—A $50,000 corporation is being organized by A. C. Hunt, James E. Laffey and W. J. Murray of this city to establish headquarters in Sheboygan, for doing a general wholesale and retail business in general automotive equipment, motorcycle and bicycle accessories, gasoline, oil, grease, waste, etc. It is planned to establish a chain of sales and service stations in the eastern half of Wisconsin catering both to city and country motorists and tractor and truck owners.

EVERY DEALER JOINS

Red Bluff, Calif., July 23.—The Tehama County Automobile Trades Assn. has been organized here with representatives of the automotive industry from every town in the county present at the meeting and enrolled as members. The following officers were elected: H. H. Wright, Red Bluff, president; Miles G. Ramer, Corning, first vice president; Harry Huber, Red Bluff, second vice president; Job B. Jukens, Red Bluff, treasurer, and George Wohl, Red Bluff, secretary and manager.

Dealers in Savannah Zone See Big Sales Year Hence

Concrete Road Construction Together With Poor Cotton Market Keep Sales Slow

SAVANNAH, July 25—Savannah automobile dealers have experienced a decided improvement in business during the last two months, as compared with the first three or four months of the year. June sales and the general automobile business showed material increases, compared with the preceding months, as a result of the reduction in prices, and a slight improvement was felt in general business conditions in this territory.

However, Percy S. Bacon, president of the local dealers' association stated that the June sales are hardly better than the average monthly sales of last year. The first four months of this year were exceedingly bad for the dealers of this territory, but the recent improvement has given them new hopes and they are putting forth every effort to increase sales.

Mr. Bacon explained that for the past two years, the automobile business in Savannah has been greatly handicapped by the construction of concrete roads, which made boggy detours necessary. These almost impassible detours not only kept out state automobilists, but also caused the heavy tourist trade from the east to take other routes to and from Florida during the winter.

Dealers Expect Improvement in Business

Since the completion of road and bridge work through this section, forming a direct route from the east through Savannah and Brunswick into the state of Florida, local dealers are expecting considerable improvement in business.

The liquidation in the cotton, naval stores and lumber markets, upon which Savannah and vicinity chiefly depend, has caused tight money, buyers' strikes and other conditions which still prevail to considerable extent. Until these markets recover considerably, normal conditions can hardly be hoped for in this territory. However, reductions in prices by retailers in general, have stimulated buying by local consumers considerably, and there is a tendency toward improvement in exports within the next six or 12 months.

The outlook for the automobile business in this territory is favorable for materially improved conditions within the next 12 months, but no decided increases are expected before the first of the year.

ATLANTA SALES DROP IN JULY

Atlanta, July 23—In spite of the price reductions, effective July 1 and the resultant increase in sales that has been experienced during the present month, as a whole July will not be as good a month for the automotive industry in the Atlanta district as June. The outlook for the future, however, is brighter than it has been for a number of months and indications are that automotive sales in this district will have picked up to an appreciable degree by early fall.

A prominent Atlanta banker, who asked that his name be withheld, declares that a thorough investigation conducted recently by his bank leads him to believe that the situation is now on the road to rapid improvement.

"For some time economic authorities have been watching for the trend in affairs that would indicate a revival in business conditions," this banker declared, "and they are now beginning to see its advent."

One of the primary difficulties in the south is the continued and unexpectedly low price of cotton, which leaves the farmer without ample finances for the purchase of automobiles and almost closes this market entirely as a profitable one for the dealers.

Conditions as a whole, however, appear to be on the upward trend, and virtually all lines of business in this section appear to be noting favorable effects as a result.

Speedway Racing Interests to Organize on West Coast

Santa Rosa, Calif., July 23.—A Pacific Coast organization for the promotion of the interests of speedway racing in the west will be formed here at a meeting of the managers of the various speedbowls of this territory at Cotati, between here and Petaluma, on the occasion of the opening of the new North Bay Counties Speedway there Aug. 14. The bowl at Cotati, the only one of its kind within 200 miles of San Francisco, is now in the last stages of construction and will be ready for the big meet some time before the date set.

Directors of the Cotati Speedway were informed recently through telegrams from J. F. O'Connor, president of the organization, who is in Tacoma, that he had signed up Roscoe Sarles, Joe Thomas, Eddie Hearne, Tom Alley, Eddie Miller and Tommy Milton for the big opening Aug. 14. A preliminary race, to give the speedsters a chance to get acquainted with the bowl, will be held in it on July 30. Santa Rosa has made a bid for these racers for Aug. 24 and 25, following the Cotati races.

BELL TRUCK REORGANIZES

Ottumwa, July 23.—The Bell Truck Sales Corp. has been organized at Ottumwa, Ia., to take over the sale of the output of the Iowa Motor Truck Co., manufacturers of Bell trucks.

The new company is headed by Paul T. Browning, who has been connected with General Motors for several years in the Buick division. He has been more recently with Sheridan Motors. Jack Miller, who has been with the Iowa Motor Truck Co. as sales and advertising manager, is secretary and advertising manager of the new corporation.

Buyers' Inquiries Bring Golden Glow to Texas

July Sales Better Than June While August Promises to Set High Mark

DALLAS, Tex., July 25.—Conditions in the automotive industry in Texas continue to show improvements from month to month. As the June sales on the part of the retailers showed an increase over those of May, so are the July sales showing an increase over those of June, and dealers declare the sales for August will probably set a record for the past 12 months. A canvass of a score of retail automobile establishments in Dallas, Fort Worth, Sherman, Greenville, Waco and other towns developed the fact that the sales for the first half of July show an increase of from 15 to 20 per cent over the sales for the same period the preceding month. Dallas wholesale dealers who are supplying retailers in north Texas, parts of New Mexico, Oklahoma and Louisiana, report that sales are increasing over the territory.

The increase in sales of automobiles, according to the local dealers, is due to three things:

First: The marketing of the grain crops in this section of Texas is putting some $30,000,000 in the pockets of the farmers. This money is getting into circulation and cars are being bought. The fruit and vegetable crop is being marketed and this is bringing some $20,000,000 more to the farmers of this section.

Increase of Sales

Second: The reduction in the prices of automobiles. Dealers who have made price reductions, and practically all have, say there has been a noticeable increase in sales since the reductions.

Third: It is the touring season and the roads are alive with motorists. More people are using automobiles for vacationing than ever before.

Nor are the retailers alone in enjoying the increased business. Even the second hand men report increased sales since money is freer.

The tire and accessory men claim they have noticed a wonderful increase in business since the first of July and are preparing for even bigger business during August and September. Trucks are being sold in larger numbers, partly due to the moving of grain and fruit crops and partly due to short freight hauls and general farm use.

Tractor sales have showed a marked increase. The majority of the tractors went to the wheat belts, it was said.

Retailers in Dallas say there are more inquiries about various makes of machines right now than there has been in three years.

A feature of the business is that in most instances cash is paid for cars, or, at least, sufficient amounts to enable the dealers to negotiate the notes and not have their money tied up.

Durant Outlines Policy to Rule Giant Corporation

Sets at Rest All Rumors With Respect to Mergers, Monopolies and Manufacturing Plans

NEW YORK, July 23—Most of the innumerable rumors about the ultimate plans of W. C. Durant are set at rest by the definite outline of policy contained in a statement which will be mailed this week to stockholders of Durant Motors, Inc., outlining the progress made thus far in developing the enterprise. In this connection the statement says:

"Durant Motors, Inc., was not organized for the purpose of monopolizing the motor car industry or effecting a combination, merger or consolidation of existing companies in either motor car or accessory lines, and, regardless of rumors to the contrary, will consider no combination, mergers or entangling alliances with any firm or corporation identified with the production of automobiles, at this or any future time.

Popular Priced Motor Cars

"Durant Motors, Inc. was organized to build a line of popular priced motor cars designed by Mr. Durant; the business is owned by Mr. Durant and his close associates, with no partner other than the investing public."

This disposes of the popular belief that Durant is building up his new enterprise with a view to selling out to the General Motors Corp. when it is built up to the right proportions. It also settles the report that he has acquired a very substantial interest in the Studebaker Corp. in the expectation of merging that company with his.

It can be stated, however, that the proceeds of sales of Durant stock are working and earning dividends. In fact, it is understood that the investments made have been so profitable that it would be possible at this time to pay a dividend on all Durant Motors stock which has been sold.

In addition to these statements in regard to policy, the letter to the stockholders says:

"Since its organization in January, 1921, three companies have been incorporated and are being independently financed to assemble the Durant line of popular-priced cars. These companies are:

"Durant Motor Company of New York.

"Durant Motor Company of Michigan.

"Durant Motor Company of California.

"Each of these companies, with respect to policy, product, operating and sales, will be controlled by Durant Motors, Inc. The parent company will be responsible for and assume all engineering expenses in addition to providing proper and dependable sources of material supply. For this service and the use of patents, inventions, name, etc., Durant Motors, Inc., is to receive a major participation in the profits.

"Durant Motor Company of New York, capitalized at $3,000,000, will assemble the Durant car at Long Island City for distribution in the Atlantic Coast territory and export markets. The plant has a capacity of 25,000 cars a year and will be in production next month. F. W. Hohensee, president and general manager of the company, was formerly in charge of the operation of the entire group of Chevrolet factories.

Plant to Have 40,000 Car Capacity

"Durant Motor Company of Michigan, capitalized at $5,000,000, with headquarters at Lansing, is building in that city a modern plant with a capacity of 40,000 cars a year. The building contract specifies completion by Nov. 1 next. Edward Ver Linden, who has been responsible for the development of the splendid business of the Olds Motor Works, is president and general manager of the Michigan company, which will assemble and distribute the Durant car in the territory between the Adirondacks and Rocky mountains.

"Durant Motor Company of California, capitalized at $3,000,000, has secured an excellent location at Oakland, and plans are now being drawn for a modern plant having a capacity of 20,000 cars a year. Construction work will go forward on a schedule to permit automobile production in March, 1922. R. Clifford Durant, who until recently was at the head of the Chevrolet Motor Co. of California, is president and general manager of this company, which will assemble the new Durant car for distribution in the Pacific coast territory.

"Durant Motors, Inc., will on Aug. 1, 1921, come into possession of the splendid plant in Muncie, Ind., now being operated by the Sheridan Motor Car Co. Division of General Motors Corp. A new company to be known as Durant Motor Company of Indiana, capitalized at $3,000,000, will be organized for the purpose of manufacturing at Muncie an exclusive six-cylinder car to sell at a popular price. D. A. Burke, formerly manager of the Chicago branch of the Buick Motor Co., will, as president and general manager, direct the affairs of the new operating company.

"When Durant comes into possession of the Sheridan plant the name of the car will be changed to the 'Durant Six.' The Sheridan is now powered with the same motor used in the Chevrolet but when the Durant company takes it over, it will use a six-cylinder motor which will be identical with the 4-cylinder used in the 'Durant four.'"

KALAMAZOO TRUCK PRICES DOWN

Kalamazoo, Mich., July 23—A general price reduction ranging from $300 on the lighter models to $425 on the heavier trucks has been announced by the Kalamazoo Motors Corp., which manufactures the Kalamazoo truck. New prices f.o.b. Kalamazoo range from $2495 for the 1½-ton truck to $4800 for the road builder's special 5-ton truck.

Chicago Market Points to 1923 as Industry's Biggest

J. V. Lawrence, Pierce-Arrow Distributor, Sounds Note of Broad Interest to Automobile Dealers

CHICAGO, July 25—With small losses in sales volume during the past ten days, as compared with the high spot for the month, business with the Chicago dealers is holding out much better than was expected. Sales during July have reached a high mark for the dull season and many dealers are of the opinion that August will produce business that will carry that month beyond its average volume.

J. V. Lawrence, vice-president of the Henry Paulman Co., Pierce-Arrow distributors in Chicago territory, summing up the automobile situation for MOTOR AGE, today said: "Good business is going to continue up to about September 15. About that time I look for an increase in sales to last for two months. I believe that we will sell more automobiles from September 15 to November 15 than we have ever sold before during the same period of the year. My judgment is that December will be dull. Beginning the first of 1922 I look for business to start with a rush and to continue with increasing volume during the entire year. I think that 1923 will be the biggest year for dealers in the history of the industry. Five per cent of this business will be new; 95 per cent of it will be replacements."

DURANT NAMES ANTHONY DEALER

San Francisco, July 23.—First announcement regarding the marketing of the new Durant car in California is released by R. C. Durant, of the Durant Motor Co., with the news that Earle C. Anthony, Inc., for 16 years Packard distributors in this state, will handle the Durant at the four most important distributing points in California—San Francisco, Oakland, Sacramento and Los Angeles. In all of these places the Anthony organization has branches.

OTTO F. MOLLER DIES

Indianapolis, July 23—Otto F. Moller, general superintendent of the National Motor Car & Vehicle Corp., died at Indianapolis July 10, following an acute attack of peritonitis, lasting one day less than a week.

Starting out seventeen years ago in the assembly department at the time the National was making the electric motor vehicles, he occupied positions in the production department, later was assistant superintendent, finally being made general superintendent, which position he had held for several years past.

Mr. Moller was considered a very capable man in the automobile industry and was held in highest esteem, not only by his co-executives, but by the shop executives under him.

Concerning Men You Know

Godfrey Strelinger, formerly a field representative for Dodge Brothers and until recently assistant sales manager of the Hayes Manufacturing Co., has severed his connection with the latter to join the field force of the Maxwell Motor Sales Corp.

H. M. Salisbury, export manager for the Maxwell Motor Sales Corp., sailed Thursday, July 14, on the S. S. Mauretania for England, France and Holland, where he will spend some time in looking over the field with a view to determining what may be expected from that quarter in the coming year.

Frank H. Golding, formerly general manager of the Holmes Automobile Co., and H. O. Swanson, formerly with the H. H. Franklin Co., have become associated with the Fox Motor Car Co., Philadelphia. Mr. Golding is general manager and treasurer of the company, and Mr. Swanson is chief engineer. The concern plans to get into production late in the year. The factory, is capable of producing 2,500 cars per year.

G. P. Schlecht, Memphis, was elected president of the Tennessee Automotive Trade Assn. at its annual convention in this city, July 19. George Byrd, Knoxville, was chosen vice president and L. M. Hirsig, Nashville, treasurer.

George Blair, formerly general manager for the Pennsylvania Rubber Co. in Philadelphia, is now associated with the Trexler company, accessory dealers in that city.

Jacob Neumark, who for the past five years has been advertising manager of the Chevrolet Motor Car Co. in New York, has been appointed as assistant to Norval Hawkins, who is on the advisory board of the General Motors Corp. in Detroit. Jacob Neumark has taken up his work in Detroit with his office located in the General Motors building of this city. Neumark has been twelve years with the General Motors companies, having served one year with Oldsmobile, six with the Oakland Motor Car Co., and five with Chevrolet. Previous to his association with the Chevrolet company he was with the Apperson Motor Car Co., Kokomo, Ind. Neumark is well known in the advertising field and as an author of books on automobile salesmanship.

George T. Briggs is again connected with the Wheeler-Schebler Carbureter Co., Indianapolis, as sales manager. Recently Mr. Briggs has been with the Motorcycle and Allied Trades Ass'n. as general manager.

Robert D. Black, who was formerly Assistant Sales Manager of the Black & Decker Mfg. Co. of Towson Heights, Baltimore, Md. has been appointed manager of the company's Philadelphia branch office. Black succeeds W. C. Allen who has been made a special factory representative, with headquarters at the company's Cleveland branch office.

Jacob Luff, Milwaukee, has been appointed city dealer in the Oakland.

Joseph E. Hofweber, LaCrosse, Wis., has been appointed Chalmers and Maxwell dealer in that city and vicinity.

Production of Doble Car Planned for Pacific Coast

San Francisco, Calif., July 23.—Backed by a number of capitalists of this city, and with Abner Doble, designer of the car, as a member of the corporation, an organization has been formed here to start construction of the Doble steamer, as soon as a factory site can be obtained. One of the first models, one that has run 57,000 miles with no sign of trouble to date, is on exhibition here. The directors of the new corporation are said to be prominent financially, and it is understood that no stock is for sale, and none will be offered, all having been taken by the men who have formed the organization. No names, other than that of Doble, have been made public as members of the corporation, but the announcement is generally regarded as reliable. Production of 500 cars a year is contemplated.

The Doble-Detroit Motors, Inc., was formed in 1916, but the War Industries Board ruled against it, and it dropped from active production after booking $27,000,000 worth of business.

ELECTRIC SERVICE IS THEME

New York, July 23—The relation between the car dealer and the electric service station was the principal topic of discussion at the meeting of the eastern section of the National Electric Service Assn. held today. H. R. Cobleigh of the National Automobile Chamber of Commerce brought out the importance of taking the owner's viewpoint and discussed briefly the advantages of the flat rate system in selling service.

J. H. Hearnan of Trenton, N. J., read a paper in which he emphasized the importance of securing the cooperation of our dealers in getting purchasers of cars to register the electric equipment on the car with the electrical service situation. I. McCulla, service manager of the Bijur Motor Appliance Co., presented some ideas on inventory systems.

A dinner was held in the evening at which Harry Tipper, business manager of "Automotive Industries," spoke on "The Value of Organized Effort."

Indiana Interests Prepare to Oppose New Truck Bill

Indianapolis, July 22—Rumors that the state administration would attempt to duplicate in Indiana the Burke bill which limits weight of loaded trucks to 20,000 lbs. and which was passed in Ohio this year, are being investigated by the Indiana Automotive Trade Assn. It is said that the bill will be drawn for the state highway commission at the instance of Governor McCray and that it will be introduced in the next legislature with administration backing. This is taken to mean that Governor McCray will call a special session of the legislature this fall, for the "next legislature" would not convene until 1923 and preparation of a bill at this time would be premature unless there is some early prospect of a legislative assembly.

In conference with Tom Snyder, secretary of the Commercial Haulers' Assn., L. M. Shaw, general manager of the Indiana Auto Trade Assn., has started defensive plans to combat the effort of the administration, which is taken to mean that the administration does not intend to build up the state highways for modern traffic but hopes to meet the situation by eliminating the heavy duty equipment.

Secretaries Shaw and Snyder propose to have a conference of all motor vehicle interests of the state with the state highway commission for the purpose of clearing the situation. The highway commission and the administration will be given an opportunity to make definitely clear their position as regards motor transportation.

The information developed in this conference will be used in organizing the state-wide sentiment of the automotive industry.

HOOSIER ASSN. ELECTS OFFICERS

Indianapolis, July 23—Negligence in marking of highway danger spots by road contractors and highway officials was condemned in resolutions adopted in the annual meeting of the Hoosier State Automobile Assn. last week. Officers elected or re-elected were the following: A. G. Lupton, Hartford City, president; Martin Luecke, Fort Wayne, first vice-president and counsellor; E. W. Steinhart, Indianapolis, second vice-president; D. N. Peck, Crawfordsville, third vice-president; C. W. Lanz, Bedford, fourth vice-president; T. A. Wynn, Indianapolis, treasurer; M. E. Noblett, secretary-manager.

Resolutions indorsing the Townsend highway bill and urging Senators Watson and New to support it for passage were adopted and ordered forwarded.

ANOTHER USED CAR SALES PLAN

Birmingham, Ala., July 23—The E. R. Parker Motor Co. of Birmingham, Atlanta and Macon, has instituted a 30-day service guarantee on every used Cleveland, Chandler or Marmon car with a 24-hour trial on every used car of any make that is sold from its three places of business. This is in the nature of a guarantee of good faith in the sale of used cars.

The company guarantees every used car leaving the shops to be in perfect condition, allowing the purchaser to try out the car for 24 hours and return it in case of dissatisfaction. When any of the three cars it handles are sold the Parker company contracts to keep them in repair free of charge for thirty days.

TOLEDO INDUSTRY ACTIVE

Toledo, July 23—The employment situation in Toledo has been greatly relieved in the last month mainly by the awakened activity at the plants which are associated with the automotive industries. Out of 26 cities of the country showing a gain Toledo was third with 15.6 per cent betterment in June.

The report of the Merchants and Manufacturers Assn. shows that during the month Toledo plants requisitioned 13,738 men of which 8,288 were vehicle workers. Most of them were taken back to work by the Willys-Overland Co.

OREGON REGISTRATIONS INCREASE

Salem, Ore., July 23—During the period Jan. 1 to July 9, 1921, there were registered with the secretary of state a total of 106,185 automobiles, 2,693 motorcycles, 3,660 chauffeurs and 454 dealers. During the same period in 1920 there were 91,931 automobiles, 3,050 motorcycles, 2,414 chauffeurs and 727 dealers. It is not unlikely that between 12,000 and 15,000 cars will be licensed in Oregon before the end of the current year.

Automotive Architecture

Planning & Building Problems

Conducted by Tom Wilder

IN this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, gas filling stations, and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars it is expected to garage.

Number of men employed in repairshop.

And how much of an accessory department is anticipated.

Rearranging and Extending Old Building

PLAN 345

Your suggestion is desired in planning an extension to my garage and a systematic rearrangement of the whole of the present building together with the proposed extension. The present arrangement of workshop, office, gas, accessories, etc., is very haphazard, the building having been extended five times already without any definite system. If we have space 50 by 30 for the workshop it will be sufficient. The Bowser must be inside as there is no curb outside to protect it.

No additional departments except those shown in the enclosed sketch are desired except a showroom to hold about two cars. The best use of the available space is desired to store cars (principally Dodge cars).—H. C. Holmfield, Victoria, Australia.

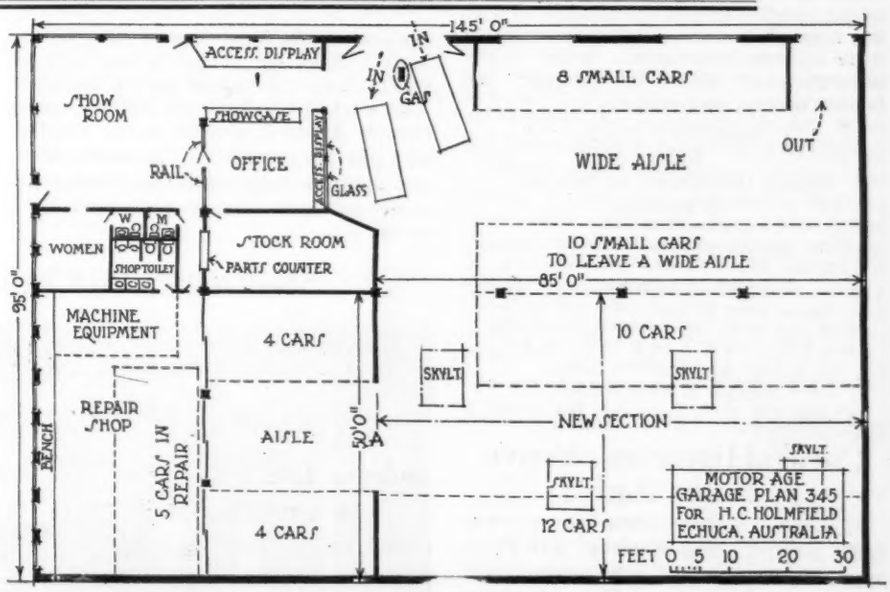
We have gone ahead irrespective of any arrangement you already have except walls and roof supports, which naturally cannot be changed. The corner is, of course, the logical location for your car showroom and looks, from your layout, to be a very strategic position, being at the intersection of three streets, one of which runs directly toward it.

Using the corner for display purposes, it is necessary to move the gasoline pump to the rear where there is a large entrance enabling cars to pass both sides of the pump and so avoid blocking the passage.

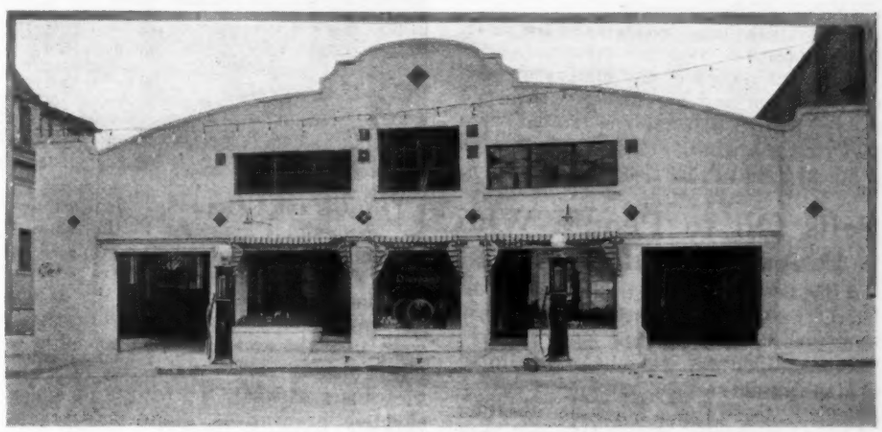
In storing cars it will be advantageous to keep the short cars in the old part, as being only 45 ft. wide, long ones will cut down the aisle space and make passing through more difficult.

By moving the shop to the back of the 95-ft. front we leave the inner half of this section of the old building for storage where by cutting through a doorway A it lines up with the new section, accommodating eight cars.

Whether you follow our layout or another you are wise in making a general rearrangement. Buildings that are put up piece-meal are never right. In an industry that is of such rapid growth as ours changes are liable to occur that would make the original plan inappropriate, even though a general plan is laid out at first.



Plan 345—Suitable for garage, showroom, repairshop and office



Garage on Historic Site

WHEN Vicksburg was an outpost of civilization, this was the site of the first Roman Catholic church or mission. One hundred years ago the church was abandoned and the Porter family used the site for its home which has been occupied continuously until it was torn down a year ago. The Porter brothers are the owners of this new building and business and one of them was born in the old home. It is in the heart of Vicksburg opposite the postoffice and next to the city hall.

This building has a frontage of 75 and a depth of 150 ft., with a drive-in entrance on the south and a drive-out exit on the north side. The office and stock room are located between the two drives, with glass all around, making the entire interior visible therefrom. A mezzanine floor is over both rooms, where reserve stock is carried.

Better Business
Money-making Ideas

A dollar will be paid for all ideas accepted as Better Business — Perhaps you have some

Cooperating with the Farmer

The Case Automotive Co. of Charles City, Ia., believes in helping the farmer all that is possible, and now that harvest time is in full force has advertised that during the month of July it will be ready to render any possible assistance to the farmers of this community by giving first preference to all farm jobs in their welding department. Below is the advertisement used in offering the farmer prompt cooperation:

HARVEST TIME
HELP
During the balance of July our
WELDING
DEPARTMENT
Will give preference to all farm jobs.

MR. FARMER

Bring your broken castings to us and get real WELDING SERVICE at a price you will be pleased to pay.

CASE AUTOMOTIVE CO.
Service With a Smile
Phone 483 805 No. Main

Cars' Histories Prove Sales Aid

"Refer to the lot number and get the car's history," said a recent advertisement of the Conduitt Automobile Company, of Indianapolis. The advertisement then went on to list a number of used cars in this manner:

"1921 Grant six roadster. Lot 142. Price $1050."

An exact record of the history of each car was kept and purchasers who asked for the history of some specific car were given all the details. This proved to be a big help in selling used cars.

Sells Oil to People Who Ask About Sign

A dealer at Indianola, Ia. has an oil barrel painted in an attractive manner and placed near his oil and gasoline pumps. Upon the side he has painted a sign which reads, "Ask about saving $14.50." Most people ask some question and are told that they will save that amount by buying oil in barrel lots. During the first week several sales were made to people who asked about the barrel.

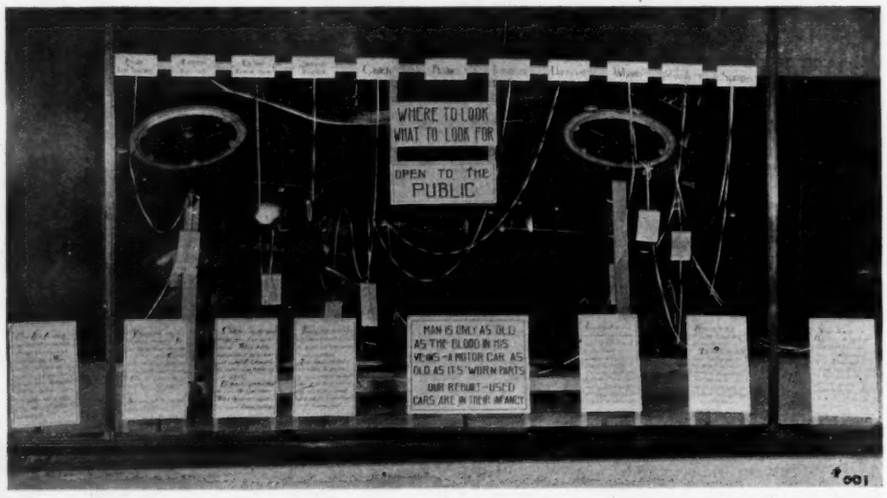
Stays Open All Night By Meeting Trains

Many dealers and service station owners in small towns would like to give all night service but have not enough business to warrant the expense. Such was the case of the Corydon Auto Co., Ford dealers at Corydon, Iowa. They solved their problem by putting a bus body on one of their trucks and having the night man meet the night trains which come in betwen 2 and 5 o'clock a. m. In this way they have one truck less on the floor, are able to keep open practically all night, and have a nice paying business on the side.

Cooperative Publicity Without Cost

It should be possible for the alert car dealer to make an arrangement with some prominently located bookstore whereby the dealer would be given some advertising in the windows of the bookstore. By getting the store to put in a window display of books dealing with automobiles—road guides, romances, etc., with a card directing people interested in cars to the dealer, and in return for this placing a card in his show window directing those interested in buying auto road guides or auto stories to the bookstore, the dealer could cooperate with the bookstore in securing profitable publicity without cost.

Selling Used Cars by Instructing Buyers



UNIQUE and educational was the used car exhibit arranged in the window of the Schlecht Motor Sales Co., Memphis, Tenn. A Dodge Brothers touring car that had been in service for a long time was secured and all working parts were exposed and properly tagged with large display cards explaining in detail the causes of wear, the results of abuse, effective preventives, steps necssary in renewing and putting in serviceable condition, and methods used by unscrupulous dealers in putting the car in demonstrating and selling condition such that weak spots would be developed with the slightest use.

Cards with ribbons leading to the various statements on some of them were as follows:

"Man is only as old as the blood in his veins. A motor car is as old as its worn parts. Our rebuilt-used cars are in their infancy."

"Clutches are the most tricky part of car mechanism. When deftly manipulated by a clever and skillful demonstrator, a multitude of car defects is covered. The hand is quicker than the eye—the foot slower. Watch the pedal controls on a road demonstration."

"The day of the fifth wheel joke is gone, but not forgotten. Many buyers take it for granted that four wheels are all that are necessary, overlooking the condition of the rims and lugs, a point so vital to good running and also a possible cause of a wreck or irreparable damage."

"Spring shackles and bolts carry the full weight of the car; on them depend to a great extent the easy riding qualities of the car. If worn parts are concealed by tightening and the tires partly deflated to offset the lack of real means of comfort, there follows after the purchase a costly tire replacement."

Back of the showroom several rebuilt cars had been taken down so that the vital working parts were exposed and the actual condition of every car could been seen.

Legal Problems

Conducted by Wellington Gustin

Order "Not Subject to "Countermand" Construed

Q—I gave a salesman an order for a large quantity of automobile parts for repairs. After the salesman had gone I decided to cancel the order, but when I looked up my copy of the order I found it read, "not subject to countermand." Had I been able to cancel the order I could have saved myself both money and trouble. Was there a safe way out of this matter for me?

An order "not subject to countermand" may nevertheless be countermanded at any time before acceptance of the order by the house or principal of the salesman. A letter or telegram to the firm cancelling the order would have been effective if the telegram or letter was received before the order was sent in by the salesman and accepted by the firm. Until a salesman's order is accepted by his principal it is in effect simply an offer to buy on your part the goods specified, and any offer must be accepted before there is a binding agreement. The Supreme Court of Michigan has passed on this precise question and its decision may be found in 181 N. W. Reporter, page 979.

Investigation Should Precede Investment

Q—Advise me with reference to the following: I am a trained mechanical engineer, with about $2,000 to invest. I propose going into the garage renting and repair business. My intentions are to obtain an interest as a working partner, in a business already established, where I can draw a certain sum per month for my services, with a share in the profits.. Before going into this I would like to have the benefit of expert advice. Will you please inform me as to the various points I shall have to investigate, so that I can be sure that the business is sound, and that my investment is secured by a mortgage on the premises, or if not by mortgage, what other means could you suggest?—David J. Paton, Brooklyn, N. Y.

Your problem is a hard one. Consult good business men on the question of what is a safe and sound proposition. It should be easy to get a position where an investment would be acceptable. I would advise that you invest in an established business only after a thorough investigation. It would be advisable to arrange to go into the employ first to satisfy yourself as to the business, and after you had satisfied yourself of the assets and the business then put your money into it. One wishing a partner and having a real business will not object to investigation through some such arrangement.

You might be able to secure a mortgage on the assets of the property but you must see to it that there are no other mortgages or other kinds of liens on the business and property prior to yours. You should of course require a complete statement of the assets and the liabilities of the business purchased. Ordinarily when one buys a business he takes an inventory of all the property purchased at its actual or market value and receives a bill to it. But you must see to it that all claims against the business are given to you and that they are taken care of. Most states have a "bulk sales law" applying to the purchase and sale of any business. This law must be complied with to protect the purchaser against possible creditors.

Los Angeles is filled with automobiles and hence there should be much work to be done on them. No doubt San Francisco is a better business town, but if you are considering health then perhaps Los Angeles would best suit your needs.

Legal Service

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.

Tax Collectors Differ in Opinion

Q—In blank for return for special tax on pleasure boats and automobiles it says, "If in the business of operating or renting passenger automobiles for hire give make, model, etc."

On back of blank it says "Persons carrying on the business of operating or renting passenger automobiles for hire are required to pay tax as follows: "Seating capacity over two but not over seven, annual rate $10."

The first Collector of Internal Revenue to visit us told us that unless we were in that business and kept a car for the purpose of carrying passengers for hire we would not be charged a tax on the car although we carried a passenger for hire, to accomodate him when he could get no other way to go. For instance, in an emergency, farmer A hires farmer B to drive him to town in farmer B's car. Farmer B does not keep his car for that business. Although farmer B accepted money to cover expenses of the trip it was to accomodate farmer A that he drove him.

The second collector to come said farmer B would be required by law to pay federal tax on his car to June 31st, also penalty of not less than one-fourth the amount of tax if he did not pay tax in same month he drove car for hire.

Which collector is correct?—Welcome Garage, Pomona, Mo.

From your statement of the case no broad or liberal construction of the words and phrases used in the tax law would include you or farmer B in the business of operating or renting passenger automobiles for hire. Business denotes what one is engaged in and gives his time and attention to for a livelihood.

Where one occasionally carries another, or hires his automobile for accommodation, it does not put him in the business of operating or renting for hire, in my opinion, and I think farmer B would be warranted in refusing to pay the tax, except under protest, and then in proceeding to recover it by law where paid.

Precedence of Mortgage on Stolen Car

Q—I had a car stolen seven months ago against which is a chattel mortgage of $1500. I also gave some cattle in for additional security which the mortgagee sold by sheriff's sale, realizing only $406. If the car is recovered outside the state of Montana where it was stolen, can the mortgagee execute the mortgage against the car? Does the reward offered for recovery take precedence over a first lien against a car? When the mortagee gets a deficiency judgment does that release the car from mortgage if it is recovered?—F. C. Finkbeiner, Grass Range, Mont.

If the chattel mortgage is a good subsisting lien against the car in Montana it follows the stolen car into any state wherever the car may be recovered and may be enforced there.

A reward claimed upon recovery of the car would be secondary to the rights of the mortgage holder. But the reward claimant would have a lien upon the car as against the car owner who offered the reward.

Where a mortgagee forecloses the mortgage and gets a deficiency judgment, his lien, under the mortgage, is submerged in the judgment and the mortgage is at an end or satisfied; hence the car would be released from the mortgage if it were thereafter recovered. Under these facts the mortgage lien would no longer exist and a reward claimant who recovered the car would have a claim on the car, and no doubt could hold same until his claim was satisfied.

While the mortgage lien merges in a judgment of foreclosure a judgment lien may be created against the car thereafter by a levy upon it.

The Readers' Clearing House

Questions & Answers

CONDUCTED BY WM. H. HUNT
Technical Editor, Motor Age

Automatic Cutout Failure: Causes and Tests

Q—On an Overland light 4 the battery cut-out fails to close. However, after closing the point by hand they will remain closed and the generator will charge the battery until the engine is stopped when the points will open as they should. We have had a new cut-out installed by an electrician, with no improvement. Next we had a new armature put in but the cut-out still remains open. Since the new armature was put in the generator knocks as soon as the points are closed causing a grinding noise, I have been keeping a file of MOTOR AGE since March.—Kenneth Hughes, Herscher, Ill.

The following suggestions will be better understood by referring to Fig. 1. The initial current from the generator flows through the binding post of the cut-out marked number 1, through the metal framework of the cut-out and through the cut-out core. The fine winding of the cut-out core, termed the voltage or shunt coil, is connected to the core at one end and to the binding post marked number 2 at the other. Binding post number 2 is designed to be grounded, that is to say, to be attached to some part of the metal of the chassis.

As the opposite side of the generator is also grounded it is apparent that so long as there is no break in the circuit the initial current will flow through the shunt winding of the cut-out and, energizing the core, cause the points to be closed.

Now examine the other circuit. From binding post number 1 the current flows through the iron frame of the cut-out, through the movable arm—called the armature—which carries one of the cut-out points. When these are brought together the path of the current is through the lower, stationary cut-out point, through the heavy winding of the cut-out called the series or current winding to binding post number 3 and thence to the battery. As you say that the cut-out remains closed after having been closed by hand it is apparent that this circuit as well as the generator is normal providing the ammeter indicates "charge" with the points closed.

From your description we should say that there is either a break in the fine winding of the cut-out or that the ground connection between binding post number 2 and the chassis is either broken or dirty. The winding can be tested with a 110 volt test line wired in series with a 110 volt bulb. Do not attempt to make the test without using the bulb.

Apply one test point on binding post number 1 and the other on binding post number 2. The lamp should light, although not up to full candle power.

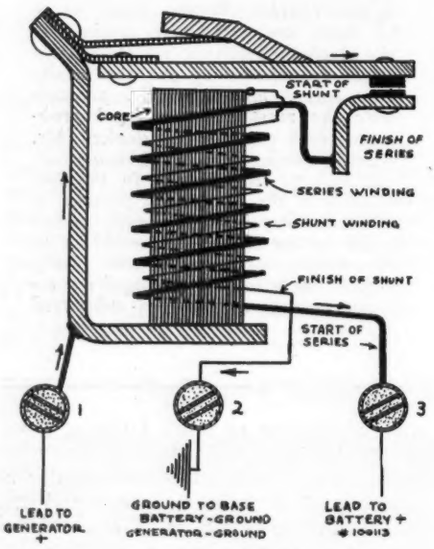


Fig. 1—Automatic cutout used on Overland 4, showing arrangement of internal circuits

Should it light and burn up to full brilliancy the probability is that the fine winding is short circuited or in contact with the iron of the core somewhere with its coils, while on the other hand, should the lamp fail to light at all a break in the winding is indicated.

The remainder of the test had best be made with a 6-volt battery as the high voltage current is quite likely to overcome the resistance of a dirty connection and give a clear indication. With two wires connected to a test battery—not the one on the car—test between terminals number 2 and any clean part of the chassis. There should be a flash. If there is not, the proof is conclusive that the ground connection between terminal number 2 and the chassis is at fault.

To corroborate this, attach a wire to terminal number 2 fastening the other end underneath the head of an engine bolt or nut. Start the engine and bring it up to speed. If the generator is operative and the cut-out has tested normal, current should flow. The points should close and everything should operate satisfactorily. The fact that you have installed a new cut-out leads us to believe that the trouble will be found in the ground connection.

The noise of the armature is caused by one of three things: the generator is not charging and when the points are brought together by hand the battery current discharging back through the apparatus causes it to drag, knock and growl; the new armature is short circuited in one or more coils, or the bearings are not all they should be. So long as the generator is not delivering current it simply runs idle, absorbing very little power, but as soon as it begins to generate, an extra load is thrown upon the bearings and if these are not in good condition and perfect alignment the noise complained of will result.

GENERATOR OUTPUT FALLS OFF AT HIGH SPEED

Q—We have an Overland four generator that was burned out and a new armature installed. This generator when car is running at 15 m. p. h. will generate 12 amp., but when car is speeded up it will not generate anything at all. We would like to know the cause, and how to remedy it?—The Automotive Co., Isabel, S. D.

This is probably a case of a high segment in the commutator or of the commutator's having been turned eccentric with the armature center. The latter is a common fault. The test for these two conditions are: first, press on each of the commutator segments at both ends with some blunt instrument. If there is the slightest movement at either end of a segment it is loose and a new commutator will have to be installed.

To determine whether or not the commutator is running true with the armature shaft center, whittle a piece of crayon to a point and, with the generator running, bring it slowly up against the surface of the commutator. If it is out of round with the armature center the chalk will mark the high spot and leave the low side unmarked, provided the test is carefully made. Should it be found that the commutator is out of true, re-turning, using the correct size of ball bearings as supports, will be necessary.

Besides the foregoing a few other causes will give rise to the same effect. Among these are weak brush springs, sticking brush holders or brushes, connections which are not tight enough and which, vibrating at certain critical engine speeds, introduce a resistance into the exterior line. It may also be possible that the armature windings are not secure in the slots and that, at high speeds, one of the coils moves a trifle and coming in contact with the iron of the armature coil forms a ground. As the armature slows down the natural spring of the coil brings it back to a normal position in the slot and causes the armature to show "clear" when tested.

MAGNETIC IRON FOR ARMATURE CONSTRUCTION

Q—Where can I purchase soft iron or pure iron in sheets for use in armatures for motor construction?

2—Where can I obtain Rich Tungsten Steel Valves or any other valve that is made of tungsten steel?

3—Is the Solex carbureter sold in this country or would it have to be imported? If sold here, could you tell me where?

4—In your estimation would there be any gain in efficiency by installing a high tension magneto on a Ford?—T. T. Durand, Automotive Engineer, Red Hook, N. Y.

1—Soft magnetic iron can be purchased in sheet form from any of the iron or steel concerns. Should you have any difficulty procuring it in your locality the Steel Sales Corp., 129 S. Jefferson St., Chicago, will supply you. For small apparatus such as small armatures, "growlers" and the like, 26 gage metal is recommended. After being cut to the correct shape the laminations should be treated with shellac or other good insulating material to prevent heating by the so-called Foucault currents.

2—The Rich Tool Co., 80 E. Jackson Blvd., Chicago.

3—We have no record of an American distributor having been appointed. The correct name and address of the factory is the Solex Carbureter Co., 39 Rue Toquet, a Levallois Perrett, Seine, France.

4—It is counter to our policy to recommend the abandonment of stock equipment in favor of that of a competitive line. We have on file the reports from hundreds of owners who have equipped their engines with high tension magnetos with highly gratifying results.

THIRD BRUSH REGULATION FAILS TO FUNCTION

Q—We have a Delco generator on a Model D 44 Buick which charges too high and burns out the brushes as fast as we can put them in. We have moved the third brush as far as we can and also put in a new brush spring and a new armature, but it does not help any. There is a flash of fire comes from the third brush. What is the trouble?

2—Publish diagram of 1916 Briscoe with Apelco System.—Christies Auto Repair Shop, Yorkton, Sask.

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

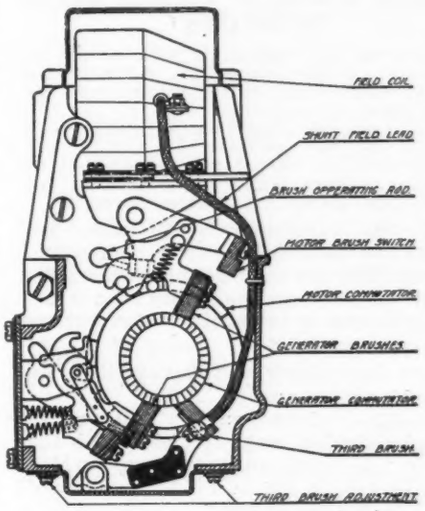


Fig. 3—One model of third brush type Delco generator used on Buick, D44

1—There were two types of third brush regulation used on these generators. These are shown in Figs. 3 and 4. Later the arm of the type shown in Fig. 3 was lengthened to secure better regulation. However, we are of the opinion that your problem is not so much one of regulation as of improper connections, short circuits or a possible ground.

Referring to Fig. 5, an internal diagram of the brush rig and connections, it will be seen that to increase the output of the generator the third brush should be moved in the direction of armature rotation or toward the grounded main brush. Now, if by any chance, the shunt field lead has been connected to the grounded main brush, moving the third brush away from it—which normally reduces the current output—would have the effect of increasing it.

It may be argued that reversing the field would reverse the generator. Not necessarily so, as it is a peculiarity of a shunt wound generator that it will readily reverse its polarity if wrongly connected to the battery.

We will now consider the second alternative, that of a grounded third brush, or a third brush lead. Again referring to the diagram, it is plainly seen that in this event the effect would be as though the third brush were non-existent and the lead directly connected to the grounded main brush. In this case the field would be energized by the current flowing between the main brushes and it would be impossible to effect any sort of regulation by shifting the third brush.

2—See Fig. 2.

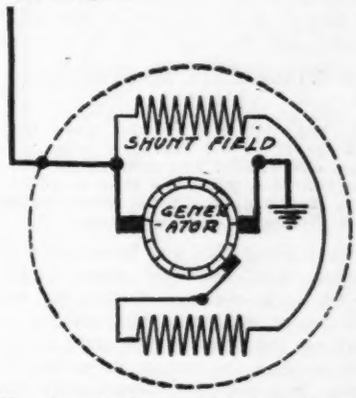


Fig. 4—Another model generator of the same make and type also used on the D 44 Buick

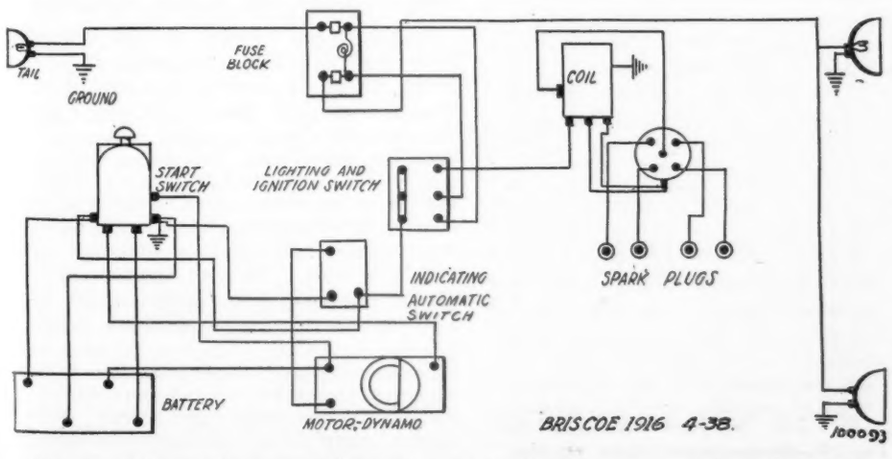


Fig. 2—External diagram of the wiring of the Apelco system used on the 1916, 4-38 Briscoe car

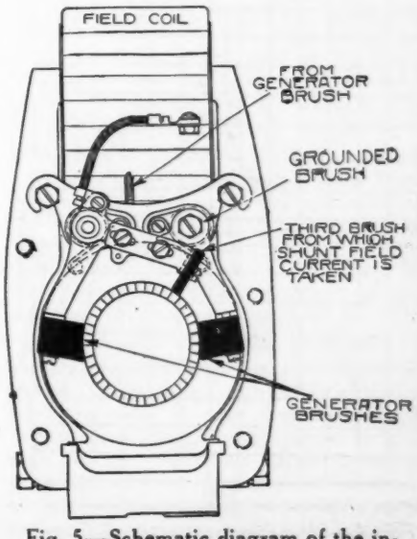


Fig. 5—Schematic diagram of the internal circuits of the above generator

ENGINES

WILL HEAVIER PISTONS UNBALANCE ENGINE?

It is desired to overcome the oil pumping in an aluminum pistoned engine by installing light iron pistons such as those manufactured by the Clark-Turner company. We would like to inquire whether these, being slightly heavier than the aluminum ones, would unbalance the engine and cause it to vibrate excessively. —August Peterriens & Son, Echo, Minn.

Without having it construed that we recommend the change we hardly believe that the type of piston mentioned will unbalance the engine if they are carefully weighed and balanced. It must be remembered that iron pistons must be fitted to a narrower clearance than the present aluminum ones. A well known manufacturer of light weight pistons recommends the following clearances:

2 13-16 in., or under	.0015 in.
2 7-8 to 3 in.	.002 in.
3 1-8 to 3 3-4 in.	.0025 in.
3 7-8 to 4 1-4 in.	.003 in.
4 5-16 to 4 7-8 in.	.0035 in.
5 to 5 1-2 in.	.004 in.
5 3-4 to 6 in.	.0045 in.
6 1-4 to 6 3-4 in.	.005 in.
7 to 8 in.	.006 in.

NEW RINGS FAIL TO STOP OIL WASTE

Q—A Mitchell Six, Model 540, uses about a quart of oil every 25 miles. It has been overhauled and new rings carefully fitted. Heavy oil has been tried but seems to do no good. What will remedy this?—A Reader, Cherokee, Okla.

It is very likely that you have expected too much from the new rings. This seems be be a common failing on the part of many dealers. Theoretically, a new, square, tight-fitting ring should prevent oil passing the piston, even though the latter is a poor fit. Practically the best of rings must be solidly backed up by correctly fitting pistons.

We would recommend that the oil supply be kept low, of course under careful watch, and that the car be driven for from 300 to 500 miles before any further remedial measures are taken. If, after this time, the rings have not seated themselves perfectly and the oil pumping continues, the only recourse will be a regrinding of the cylinders and the installation of correctly fitting pistons and rings.

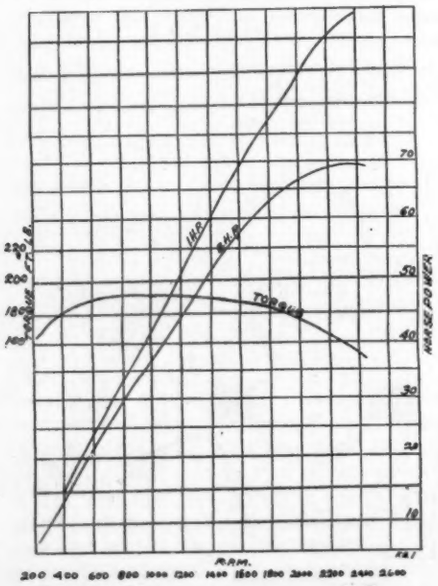


Fig. 6—Horsepower curve of Continental model 8A engine as employed in the Paige 6-66

VALVE TIMING OF VARIOUS MAKES OF ENGINES

Q—Can you supply us with or tell us where we can obtain the valve timing that each manufacturer recommends for his make of engine?

2—Also the clearance between valve stem and and push rod?

3—Are the valve tappets adjusted to this clearance while the engine is hot or cold?—Mervin C. Lawton, Dixon, Ill.

1—The manufacturers will supply you with the information upon application. MOTOR AGE has most of this data on file and will be pleased to supply it on whatever engine it is desired. However, to compile a list of the timing of all engines is a larger undertaking than we would care to engage in.

2—This information you will find in the instruction books furnished with the cars. A rough and ready rule which works well is .004 in. for the intake and .007 in. for the exhaust.

3—Hot.

OIL LEAKS INTO CIRCULATION SYSTEM

Q—We are having considerable trouble with an Oakland 8. We have about exhausted our ingenuity in trying to ascertain wherein the trouble lies and appeal to you for a suggestion. It is impossible to drive the car for more than a mile or two without the water reaching the boiling point. There seems to be oil getting into the radiator as well as water getting out. All leaks that we have been able to find have been mended. Beside this the following work has been done: ignition overhauled and adjusted, new carbureter installed, oiling and water circulation system thoroughly examined, cleaned and checked up, piston rings examined and new ones installed where needed, new gaskets put on. Advise us as to what you think the trouble is—Howard Avenue Garage, Geo. L. Laney & Son, Prop., Rockville, Ind.

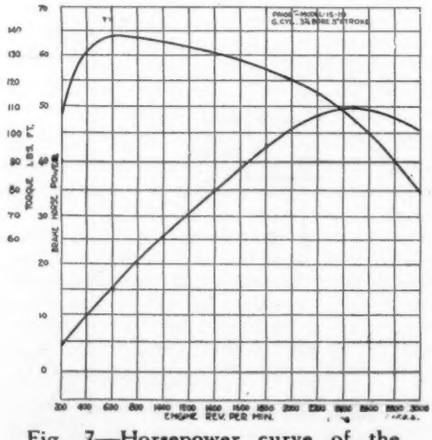


Fig. 7—Horsepower curve of the Paige light six engine which is manufactured by the Paige-Detroit Motor Car Co.

Accepting your statement that the ignition is properly timed, that the new carbureter is functioning correctly and that the water and oil are circulating properly we can think of nothing else but that possibly there is a considerable leak between the combustion chamber and the water jacket. This may be due to a crack in the cylinder or the result of a warped cylinder head, which cannot be pulled down true and flat. Either of these conditions would account for the excessive heating and the quantity of oil getting into the water.

The remedy is obvious in either case. A cracked cylinder can be readily repaired by the silver-nickel alloy process, while a warped head can be trued in a shaper or with a surface grinder. However, should the head be found at fault it is recommended that a new one be installed.

SOUNDS LIKE A PISTON SLAP

Q—I recently overhauled a 1917 model Oakland putting in new pistons, wrist pins and bushings and taking up all connecting rod bearings. It still has a peculiar knock especially when idling or on a heavy up-grade. Could this be in the push rod or where?—Chas. F. Guth, Fort Reno, Okla.

We are rather of the opinion that one of the new pistons is causing the trouble. The best authorities are reaching the opinion that the fitting of new pistons without regrinding the cylinders is not the best practice for the reason that the cylinders are invariably out of round and worn so much larger through the piston travel than at either end that in order to get a new piston into them it is necessary to lap or grind it down until it is really little better than the old one except that it is round. At any rate, it appears to us that you have a job of refitting on your hands.

HORSEPOWER OF PAIGE ENGINES

In the March 10 issue of MOTOR AGE, data regarding the horsepower of the Paige and other engines was published. The attention of MOTOR AGE has been called by the Paige company to the fact that the data, upon the foundation of which the horsepower curves were drawn, is incorrect. Figs. 6 and 7 give the corrected curves showing the characteristics of the engines employed in the Paige cars. The horsepower curve of the Continental 8A engine which is used in the Paige 6-66, shows a lower horsepower output than was secured in the Daytona-Paige model, as this is a higher compression engine particularly adopted to this sport type of car. The curves given herewith, however, show the general characteristic of the engine as they might be expected to appear in the hands of the average driver.

MISCELLANEOUS

INTERESTED IN FRICTION TRANSMISSION

Q—What are the disadvantages of the friction transmission such as used by the Metz car some years ago?

2—Are there any manufacturers making such a car at the present time?

3—If possible, show a layout of the Metz transmission.

4—What is the efficiency compared to the gearset?

5—If properly designed, would this transmission be practical for light cyclecar construction?—William Menewisch, Philadelphia, Pa.

1 and 4—It is counter to our policy to comment on the relative merit of motor units, or products.

2—Yes. The Kelsey Car manufactured by the Kelsey Motors Co., Newark, N. J.

3—See Fig. 8.

5—The friction type transmissions did very creditable work for a number of years. That they have been supplanted by the gear type does not necessarily argue that they were inefficient. We have no doubt that you would find one quite satisfactory in a car of the type and weight which you mention.

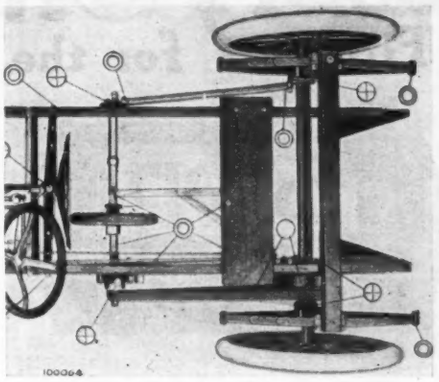


Fig. 8—Typical friction drive transmission as used on the Metz cars

ESSEX DOES NOT CLAIM HALF MILE RECORD

Q—What car has the world's record?

2—Does the Essex car hold the half-mile record?

3—How is the Grant Six for speed and pick-up? I have been informed that it is faster than the Essex for a half-mile.—O. M. Mick, Harrisburg, Ill.

1—Duesenberg, driven by Milton. Time 11.57 sec., or at the rate of 155.57 m.p.h.

2—It has never been claimed that the Essex holds the one-half mile record.

3—Although we have no exact figures covering acceleration or maximum speed we understand that the Grant Six is performing satisfactorily in these respects. It is counter to our policy to comment upon the relative merits of cars, apparatus, or other products.

CRANKSHAFT HAS TOO MUCH END PLAY

Q—What can be done for a 1917 Hudson Super Six that has over ½ in. of end play in the crankshaft? The bearings seem to be tight. How can we take it out?—Raymond H. Brown, Chicago, Ill.

It seems incredible that any crankshaft should develop the amount of end motion mentioned. Is it not possible that you have made a mistake in your measurement? The best remedy will be to install a complete set of main bearings as these also take the thrust.

FORD SPECIAL SPEEDSTER FAILS TO SPEED

We have rebuilt a Ford using roof 16-valve head, Miller carbureter, special camshaft and standard gears. The best speed we can get is about 65 m. p. h. on a straightway and 54 m. p. h. on the track. We have a set of House wire wheels equipped with the standard 30x3½ in. tires. Would 28x3½ be advisable, using a 3 to 1 gear? The engine has power but will not turn over fast enough.

2—What kind of oiling system would supply enough oil to the connecting rods and main bearing?—Otto Rosenau, Gotebo, Okla.

You are certainly not getting all the speed of which this outfit is capable. You do not mention whether or not you have lightened up the pistons and connecting rods. If this has not already been done we suggest that it be attended to. Also you fail to state whether the flywheel has been lightened. Many of the builders of Ford racing cars cut it down to 12 lbs. or even lighter. Loosening up the bands often adds several miles per hour to the speed. If you can hold your engine speed up to 2,600 to 2,800 r. p. m. we would advise the retention of the present wheels and the raising of the gear to 4.25 to 1 or even 3 to 1. A high tension magneto may also help.

2—Some of the builders are drilling the crankshafts through the main bearings and the short throws and installing pressure systems. This method seems to be giving very fine results

Mystery Tales

HAVE you ever had a little mystery in your shop? Most everybody has. For instance, one reader called up the editor and asked why the small pin through the top of the distributer shaft which drives the rotor brush of a well known make of high tension distributor, keeps breaking. He has used six, the last one of which was especially made of tool steel and case hardened. As this part bears no strain the breakage constitutes a mystery. The solution of it may be found by some clever mechanic in Bangor, Tallehassee, Walla Walla or Okmulgee. When it is found, the finder will please oblige us with an elucidation.

There are thousands of these inexplicable mysteries (which, by the way, are usually very easily explained) developing daily, and it is the purpose of the "Mystery Tales" column to draw them out. If you are hiding a dark secret which is slowly but surely souring your disposition, sapping your vitality and ruining your life, drag the pesky thing out into the sunlight and let everybody take a look at it. Perhaps somebody in the crowd has a club up his sleeve in the form of a correct, or at least a plausible explanation, which will lay the thing low and save your sacred reputation. Or, perhaps you have the weapon which may preserve the sanity of some other sufferer. Now, altogether! Send in your mysteries and solutions!

READER CORRECTS A POSSIBLE MISINTERPRETATION

Excessive Side Motion of Connecting Rods

Q—Will side play in connecting rods cause knocks if play is enough to allow top end of rod to strike side of piston?—Wm. Atin, Ansley, Nebr.

The above question appeared in the July 7 issue of MOTOR AGE and elicited the reply that the striking of the top of the connecting rod on the piston should not of itself cause a knock.

Mr. J. H. Delperdang, a garage and machineshop proprietor in Tripp, S. D., differs with the editor on this point and has favored us with the following letter of correction:

"I noticed in your issue of this week (July 7) the question, 'Will side play in connecting rod cause knock if play is enough to allow top end of rod to strike side of piston?"

"You claim that it will not, but I have found that it does, as we have taken cars or motors that had such knocks and after bending the rod so that it could not hit the piston the knock was gone. I am positive that it will not knock, for we have done this many times and have stopped the knock every time.

"Of course, if the crankshaft has end play enough to allow all connecting rods to strike the pistons then the play should be taken out; but this is not always the case, as sometimes the connecting rod runs too close to the side of the piston so that it does not take much to get it to hit the piston and to knock. That is one thing we are very careful of in this shop."

This is the kind of co-operation MOTOR AGE is fostering, we cannot have too much of it. We urge that the questions and replies be carefully studied and that the experiences of the members of the trade covering the various points as they come up, be freely exchanged. This sentiment will be found expressed on the Repair Shop page but it is not meant that it be confined to that department. Every article in the Clearing House should be studied and criticized if criticism is due. If it had not been for the exchange of ideas and the dissemination of knowledge not only would the automobile never have been developed but the human race would still be groping blindly along through the stone age.

The Accessory Show Case

New Fitments for the Car

Briggs & Stratton Ford Door Handle

A "T" form door handle, recently placed on the market by the Briggs & Stratton Co., Milwaukee, is internally fitted with a lock which can be operated only by the key made for it. The handle is designed for quick attachment to Ford sedan and coupe models and is claimed to make them as nearly theft-proof as is possible. Though made for attachment to the right hand door, it is asserted that by slightly filing the shaft of the left hand door lock the new handle can be readily attached thereto also.

Security Tire Theft-Signal Prevents Pilfering

The purloining of unprotected car equipment, especially tires, is greatly on the increase. It is to combat this condition that the Security Tire Theft-Signal has been evolved. Finished in a brilliant red, the device is made in such a way that it clamps the extra tire and rim to the tire carrier. The lock, said to be non-pickable, is of the dust-proof type supplied by Corbin. As a further theft deterrent, a reward of $25 is offered for the apprehension or conviction of anyone stealing or tampering with a tire protected by the signal. Selling at $8 and supplied in the 3½, 4, 4½ and 5 in. sizes, the device is manufactured by the Security Manufacturing Co., of Los Angeles, makers of the well-known Security Auto Theft Signal.

Heavy Duty Electric Headlights for Trucks

The R. E. Dietz Co., 60 Laight St., New York, have announced a new electric headlight of exceptionally heavy construction for motor trucks. Marketed under the name "Radio," the new headlamp is 7½ in. in diameter and equipped with a 7 in. reflector and "National" anti-glare lens. The two-piece shell, making up the body of the lamp, is drawn from 18 in. cold rolled steel, and the rim for the lens, which is screwed securely to the lamp by four screws, is drawn from the same material. The two bracket sockets are solidly spot welded to the lamp body and fitted with set screws and lock nuts. Finished on the outside in black, baked enamel and with white enamel on the inside, the lamp comes equipped with a 6-8 volt bulb of standard candle power.

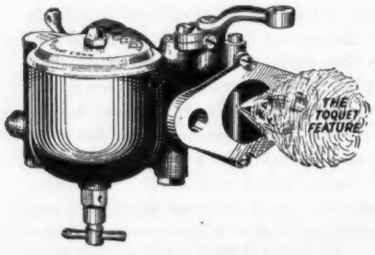
Dietz heavy duty electric headlight

Thullen signal and tail light

Briggs & Stratton Ford door handle

Thullen Signal and Tail Light

A new intention indicator for the rear end of cars is known as the Thullen Signal and is manufactured by the Grand Rapids Brass Co., Grand Rapids, Mich. The device is electrically controlled and indicates the driver's intention by means of the plain spelled words, "Left," "Right" and "Stop," instead of by a code or color scheme. The control switch designed to be mounted upon the steering column directly underneath the steering wheel has three plainly marked buttons corresponding with the lettering of the signal, and a fourth button to which the horn circuit is wired, thus bringing all signal controls to one quickly and easily reached point.



Toquet Two Jet Carbureter

New Oil Makes Springs Ride Easy

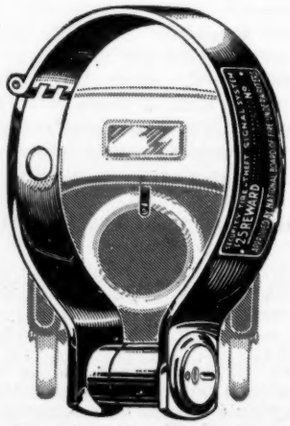
Making perfect spring lubrication a matter of minutes is the purpose of Moon-Shine Penetrol Graphite Penetrating Oil. This lubricant is a compound of a paraffine oil fuse and a dust, water and rustproofing fluid in which a finely pulverized graphite is held in suspension. It is claimed that it is unnecessary to spread the spring leaves when applying Moon-Shine Penetrol, as sprayed or painted on one side of the spring it creeps and seeps between the leaves and, within a few moments completely saturates the inter-leaf spaces.

One application per month is recommended after the springs have been once thoroughly treated, as the graphite soon forms an anti-friction film between the leaves and the oils, drying upon the outside form a varnish-like protective coat. The new lubricant is being marketed through the jobber and dealer trade by the Moon-Shine Manufacturing Co., 1716 Grand Ave., Kansas City, Mo.

Toquet Two Jet Carbureter for Fords

After extensive tests over a period of three years, and satisfactory service on over 20,000 Ford cars in all parts of the country, the Toquet Carbureter Corp., New York, announces the Toquet Two Jet Carbureter to the trade. The device has a main jet for high speed work which produces a completely blended mixture in exactly the correct proportions.

However, it is claimed that the principal feature of the Toquet carbureter is the auxiliary or low speed jet which is, in reality, in action at all engine speeds, and has a very marked influence on the finer atomization of the fuel with a consequent economy and a power development.



Security Tire Theft-Signal

Service Equipment
Time Savers for the Shop

Manley Universal Piston Vise

The advent of the extremely light weight pistons has necessitated the development of a tool for holding them securely while installing wrist pins or rings without danger of cracking or distorting them. Such a tool is the new Manley Universal Piston Vise offered by the Manley Manufacturing Co., York, Pa.

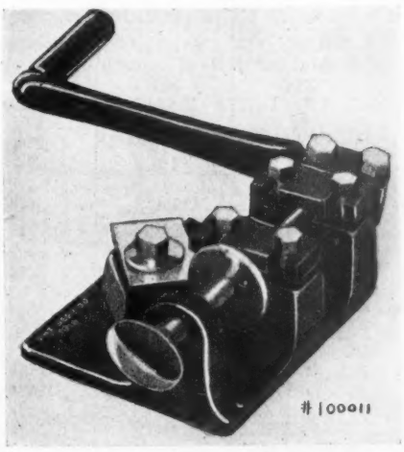
It is claimed for the new vise that it will accommodate pistons ranging in size from 2 11/16 to 5 5/16 in., being instantly adjustable to the various sizes without the necessity of changing parts. This is accomplished by slotting the screw holes of two of the jaws so that they can be shifted in and out from the center of the apparatus, and equipping the remaining jaw with an eccentric clamp.

Another feature of the vise is that the hole through the center is amply large to pass the large end of a connecting rod so that it is unnecessary to remove the latter from a piston when changing the rings.

Koehler Valve Reseating and Facing Tool

Many improved features characterize the Koehler Valve Facing Tool. Among these is the fact that the cutter is not ground to any arbitrary angle but is ground straight and may be instantly adjusted to the correct angle for the valve it is desired to dress. It is claimed that by using the Koehler facing tool it is unnecessary to reseat the valve port except in rare cases as, if the valve has worn the port to a different angle from the original one, it may be faced to the new angle and thus avoid both the machine operation on the cylinder port, or the tedious job of valve grinding.

Another feature of the Koehler tool is that the operator has the valve in full view at all times. The handle clamps on the valve stem instead of being attached thereto by means of a set screw. It is claimed that the clamping method avoids injury to the stem. The Koehler valve facing tool may be purchased at the price of $10 from jobbers, dealers or the manufacturer, the Ridgar Metal Products Co., 620 Consumers Bldg., Chicago.



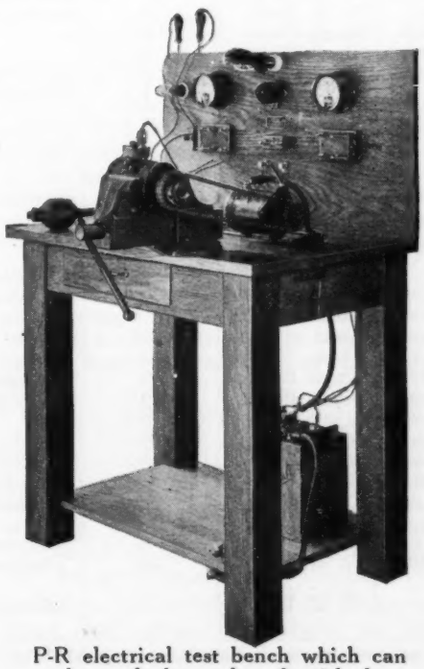
Koehler valve reseating and facing tool

Magic Wand spark plug tester

Spark Plug Tester Is Shock Proof

Unpleasant shocks while testing spark plugs are avoided by the use of the Magic Wand Spark Plug Tester, marketed by the Magic Manufacturing Co., 538 South Dearborn street, Chicago. The device is made with a double circuit by which the high tension current is lead to a thumb button switch on the handle.

To use, the point of the tool is brought in contact with the spark plug terminal, and the other end of the circuit, which consists of a fitting projecting at right angles downward from the point, is brought in contact with the spark plug shell. This of course has the effect of short circuiting the plug. The thumb switch is then depressed, drawing a spark between it and the metal part of the tool. As practically the full volume of the current passes between these points, the quality of the spark can be judged.



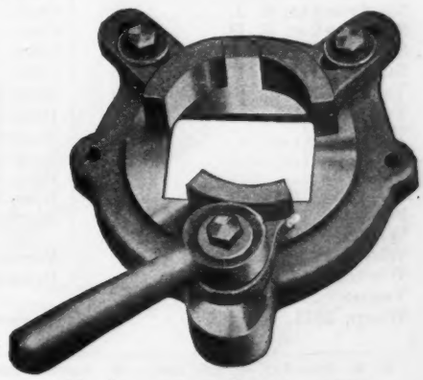
P-R electrical test bench which can be made from plans furnished

Automotive Electrical Test Bench Plan

With the plans and specifications supplied by the P-R Electric Starter Co., 7335 Vincennes Ave., Chicago, it is claimed that any mechanic can assemble an automobile electrical test bench at a reasonable cost. When equipped with a large vise having four inch jaws and a seven inch opening the outfit will test generators at various speeds and also the torque of starting motors. It is claimed that the vise will hold any size machine, round or square and that the drive chain adjustment keeps the latter taut.

A double-throw double-break switch is wired into the circuit in such a way that it switches to either the 6 or 12 volt batteries used in testing and at the same time automatically changes the cut-out connections so that they are correct for the voltage being used.

Test leads and points connected to the 110 volt service line are used to detect abnormal grounds. These points are also connected to a double-throw double-break switch so that they may be changed over to a two volt circuit for testing low resistance coils and making milli-volt drop readings. The chief value of the plans, which sell for $1.50, is that they indicate how to use various stock parts which may be purchased from local concerns and also the proper arrangement of the testing circuits.



Manley universal piston vise

Clutches on 1920 Passenger Cars

Motor Age Maintenance Data Sheet No. 160

One of a series of weekly pages of information valuable to service men and dealers—save this page

NAME AND MODEL	Make	Type	Number of Disks	Facing Material	Size of Thrust or Clutch Bearing		
					Inside Diameter	Outside Diameter	Width
Concluded from last week							
Madison	Borg & Beck	Single Plate	2				
Maibohn, B	Borg & Beck	Single Plate	2	W. Asbestos	2 9/32	3 7/16	3/4
Marmon	Own	D. M. Disk	19	Raybestos	1.574, 1.640	2.5197	.7087
Maxwell, 25	Own	Cone	..	Asbestos	2.625	3 1/2	3/4
McFarlan, 147	Borg & Beck	Single Plate	2	Raybestos			
Mercer, S5	Own	D. M. Disk	11	Raybestos	3 1/4	4.245	.8125
Metz, M6	Own	D. Disk	2	W. Asbestos	1 15/16	3 7/16	1 1/16
Mitchell, F40	Bork & B.-Sp.	D. M. Disk	2	Fabric	2 1/4	3 5/16	3/4
Moon, 6-48	Borg & Beck	Single Plate	2	Raybestos			
Monroe	Mechanics	D. M. Disk	7	Fiber	2.01	3.256	17/32
Murray	Borg & Beck	Single Plate	2				
Meteor, R. & R. R.	Borg & Beck	Single Plate	2	Asbestos	1.5748	3.5433	.9055
Nash, 681-7	Borg & Beck	Single Plate	2	Raybestos	U. S.	Bearing No.	10-B
National Sextett, S. B. B.	Borg & Beck	Single Plate	2	Asbestos	2 1/4	3 7/16	3/4
Nelson, E	Own	Disk	..		1.574	3.149	0.708
Noma, C	Borg & Beck	Single Plate	2				
Norwalk, 430KS	Borg & Beck	Single Plate	2	Raybestos	.654	1.575	.468
Oakland, 34C	Northway	Cone	..	Leather			
Ogren, 6-60	Muncie	D. M. Disk	13	Raybestos	.9842	2.047	.5905
Oldsmobile, 45B & 37B	Own	Cone	..	Leather	2 3/4	3 7/8	7/8
Olympian, P45	Borg & Beck	Single Plate	2		1 3/4	3 3/32	13/16
Overland, 4	Borg & Beck	Single Plate	2	Raybestos	1.5625	2 19/32	5/8
Owen Magnetic, T60	None used.	Magnetic Gear	Shift				
Packard, 335	Own	Dry Plate	6	M. Asbestos			
Paige, 6-66	Borg & Beck	Single Plate	2	Rusco	2.250	3 7/16	3/4
Peerless, 56-S6	Own	D. M. Disk	10	Raybestos	1 13/16	3	3/4
Piedmont, 4-30	Borg & Beck	Single Plate	2	Raybestos	1 3/4	3 1/8	13/16
Pierce Arrow, 31	Own	Cone	..	Leather	.9843	1.89	.59
Pierce Arrow, 51	Own	Cone	..	Leather	.9843	1.89	.59
Pan, A	Borg & Beck	Single Plate	2	Asbestos			
Pilot, 6-45	Borg & Beck	Single Plate	2	Multibestos	.9842	2.047	.5905
Porter, 46	M. & E.	D. M. Disk	4	Raybestos	2.250	3.3125	.750
Premier, 6-D	Borg & Beck	Single Plate	2		2 9/32	3 7/16	3/4
Reo, T6	Own	D. M. Disk	13	Asbestos	1.1875	1.752	2 1/8
Revere, C-D	Brown-Lipe	D. M. Disk	10	Raybestos	1 1/8	1 5/8	7/8
Roamer	Borg & Beck	Single Plate	2				
Rock Falls, 12	Borg & Beck	Single Plate	2				
R. & V. Knight, R. & J.	Borg & Beck	Single Plate	2	Raybestos	6 3/4	9 3/4	1 1/8
Saxon, 125	Detlaff	Dry Plate	4	Asbestos	1.5748	3.1496	.7087
Sayers	Borg & Beck	Single Plate	2				
Scripps Booth, B39	Northway	Cone	..	Leather	2 3/4	3 55/64	7/8
Seneca, L. 20	Borg & Beck	Single Plate	2	Raybestos	1 1/8	3	7/8
Severin							
Skelton, 35	Borg & Beck	Single Plate	2	Raybestos			
Standard	Borg & Beck	Single Plate	2	Raybestos			
Stearns, E	Own	D. M. Disk	15	Raybestos			
Stephens, 80	Borg & Beck	Single Plate	2		2 1/4	3 7/16	3/4
Stevens-Duryea	Own	D. M. Disk	15	Raybestos	1.1811	2.8347	.7480
Studebaker, E. J.	Own	Single Plate	2	Asbestos	3/4	1	1 1/4
Studebaker, E. H.	Own	Cone	..		1 1/4	1 9/16	2 3/16
Studebaker, E. G.	Own	Cone	..		1 1/4	1 9/16	2 3/16
Stutz	Own	Cone	..				
Texan	Borg & Beck	Single Plate	2	W. Asbestos	.9843	2.0473	.5906
Templar, 445	Borg & Beck	Single Plate	2	Raybestos	2	2 59/64	3/4
Tulsa	Borg & Beck	Single Plate	2				
Velie, 34	Borg & Beck	Single Plate	2				
Velie, 48	Borg & Beck	Single Plate	2				
Westcott, C38	Borg & Beck	Single Plate	2	W. Asbestos	2.2485	3.4345	3/4
Westcott, C48	Warner	D. M. Disk	14	Raybestos	2.5775	3.972	1 3/16
Willys-Knight, 20			..				
Winther, 61	Warner	D. M. Disk	6	Raybestos	.9842	2.0472	.5905
Winton, 25	Brown-Lipe	D. M. Disk	12	Thermoid	.9842	2.0472	.5905
Vogue			..				
Wasp, 2011	Covert	D. M. Disk	7	Asbestos	.98425 Bearing No.	2.0472	.5905

D. M. Disk—Dry Multiple Disk. M. Asbestos—Molded Asbestos. W. Asbestos—Woven Asbestos. W. Fabric—Woven Fabric. O. M. Disk—Multiple Disk in oil

Automotive Repair Shop
Practical Maintenance Hints

Keeping the Truck Fit

OVERHEATING and other common hot weather troubles are usually due to lack of forethought and to mistakes that can be easily avoided. The main points which require attention have been briefly outlined by the International Motor Co., manufacturers of Mack trucks.

Here is a list of questions for the truck service man:

1. Do you understand the truck's cooling system thoroughly? See that the flow of water is not impeded by any sort of obstruction and that the overflow pipe is not bent below the level of the base of the radiator filler. Be sure that the overflow pipe is not clogged or flattened.

2. Is the radiator clean? The front of the radiator should be free from dirt, license plates and signs. Also, the back of the radiator should be unobstructed so that nothing will impede the circulation of the air.

3. Are the hose connections watertight and is the hose in good condition? Be sure that the rubber has not been affected during the winter by an antifreeze solution. Only the best quality rubber hose should be used, as the inside tubing of cheap hose is easily worn away and the rubber particles carried along with the water clog up the radiator.

4. Does the fan turn freely and is the belt tension right? The fan should be clean and its bearings should be well greased. A good test is to turn the fan by hand with the engine shut off. If it is possible to slip the belt easily, but not possible to spin the fan, the tension is right.

5. Is the carbureter choke in proper repair so that it opens all the way? The seasonal shutter on the hot-air tube should be open. Is the float level correct? If too high, slight flooding will cause an over-rich mixture.

6. Does the ignition system furnish a spark of sufficient strength? A weak spark due to excessive lubrication of the magneto, dirty breaker or distributer, or weak magnets, will have an effect similar to late spark timing, and overheating will results.

7. Are the valve tappets properly adjusted? They should have from .008 to .010 in. clearance, which may be gaged as about the thickness of an ordinary postcard.

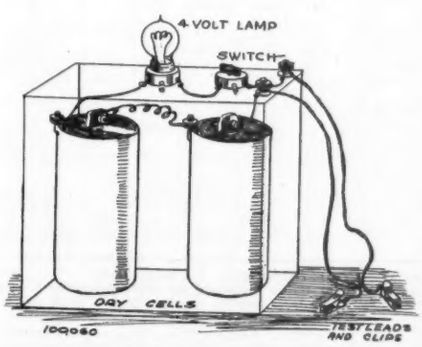
8. Are the cylinders free from carbon? If not, remove it.

9. Is the oil in the crankcase clean? Gasoline, dirt, or other foreign substances will impair the quality of the oil in the crankcase, resulting in overheated parts due to insufficient lubrication. The oil reservoir should be drained every 1,500 miles, the walls thoroughly cleaned, and a fresh supply of oil should then be put into the crankcase.

10. Are you using the right grade of oil? Because of the increased temperatures it is often advisable in summer to use a heavier grade of oil than in winter.

11. Are the exhaust pipe and muffler clean? Practically 40 per cent of the heat of combustion escapes through the exhaust. It follows, therefore, that if any part of the exhaust system is obstructed, a part of this heat must be carried off by the cooling water, which will naturally raise its temperature.

12. Are the brakes free? A dragging break will cause overheating in hot weather that might not occur in cool weather.



A handy device for timing breaker points

Cooperation

COOPERATION is the keynote of the automotive industry this year and will become more important as time goes on. Motor Age is pleased to extend an invitation to its readers, wherever they may be, to contribute short articles and sketches on easy or improved ways of doing hard things, which they may have worked out and thus lend their aid in HELPING THE OTHER FELLOW. Correspondence among contributors is also strongly urged. Let's get together and make this a happy family with one end in view, that of hearty, unselfish COOPERATION.

A Handy Device for Timing Breaker Points

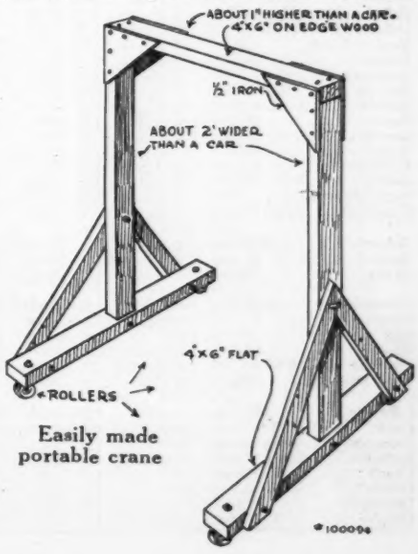
A handy little device for determining the exact instant at which the distributer breaker points separate can be quickly assembled from two or three dry cells, a four or six volt bulb, two pieces of wire about four feet long and a couple of testing clips. The parts are wired in series; to use, the clips are attached, one to the breaker arm and the other to the stationary point. So long as the breaker points are in contact the bulb will burn. Upon their separation the light will be extinguished. Of course the device will not determine to what width the breaker opens but its use will save much time as it eliminates the necessity of stepping back and forth between the distributer and the starting crank.—Enns Brothers Garage, Reedley, Calif.

Easily Made Portable Crane

I notice that you have asked for articles and sketches that will be of help to others. Here is a portable crane that I built about three years ago that cost me about $6 without the hoist. I found it very handy as it could be run to the job anywhere in the shop.—Wesley H. Brown.

SHELLAC ONE SIDE OF GASKETS

When installing a new gasket it is better to shellac only one side and give the other side a light coating of graphite grease. This will make just as tight a joint as though both sides were shellaced and will prevent the spoiling of the gasket when the parts are again separated.



Easily made portable crane

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....G	Guy..	6-3¼x5	123	32x4	$2975	$2975	....	$3680	$3680
Ace.....H	H-S..	6-3⅜x5	123	32x4	2975	2975	....	3680	3680
Ace.....L	H-S..	4-3¼x5	116	32x4	2260	2260	....	....	....
Allen.....Series 43	Own..	4-3½x5	110	32x4	‡1385	1385	....	....	2195
Ambassador.....R	Cont..	6-3⅜x5¼	136	33x5	....	†4500	$4500	....	6500
American.....C	H-S..	6-3¼x5	127	32x4	2195	2275	†2350	....	3150
Anderson.....Series 40	Cont.	6-3¼x4½	120	33x4	2195	1795	1845	2795	2795
Apperson.....8-21–S	Own..	8-3¼x5	130	34x4½	....	3000	3250	4500	4500
Apperson...Anniversary	Own..	8-3¼x5	130	34x4½	....	3500	3750	....	....
Auburn.....6-39	Cont..	6-3¼x4½	120	32x4	....	1695	†1695	2795	2795
Beggs.....20T	Cont.	6-3¼x4½	120	33x4	1775	1775	....	2675	2775
Bell.....4-32	H-S..	4-3½x5	114	31x4	....	1495	....	....	....
Bell.....6-50	H-S..	6-3¼x5	124	32x4	....	1695	....	....	....
Biddle.....81	Buda.	4-3⅞x5½	121	32x4	3475	3475	....	....	3975
Birch Super-Four	H-S..	4-3½x5	117	33x4	1345	1345	†1395	2295	2295
Birch Light Four	Lelt..	4-3½x4½	108	30x3½	1195	1195	....	....	....
Birch Light Six	H-S..	6-3¼x5	117	33x4	1595	1595	....	....	....
Bour-Davis.....21S	Cont.	6-3½x5¼	126	33x4½	†2385	†2385	2385	....	....
Brewster.....91	Own..	4-4 x5½	125	32x4½	†7000	7000	....	....	10500
Briscoe.....4-34	Own..	4-3⅜x5	109	31x4	1085	1085	....	1685	1685
Brook.....S-21 A	Own..	2-3½x3⅞	90	28x3	395	....	....	....	....
Buick.....1922-44-5-6-7	Own..	6-3⅜x4½	118	33x4§	1495	1525	....	2135	2435
Buick.....1922-48-9-50	Own..	6-3⅜x4½	124	34x4½	....	....	1735	2325	2635
Bush.....E.C.4	Lyc..	4-3½x5	116	33x4	....	1245	....	....	....
Bush.....E.C.6	Rut..	6-3¼x5	116	33x4	1295	1575	....	2050	2150
Cadillac.....59	Own..	8-3½x5⅛	(125 (132	34x4½ 35x5	3790	†3790	 3940	....	4950 5190
Carroll.....C	Roch..	6-3½x5	128	....	3985	3985	....	....	....
Carroll.....D	Roch..	6-3½x5	128	....	3185	3185	....	....	....
Case.....V	Cont.	6-3½x5¼	126	34x4½	....	†2250	2250	2900	3285
Chalmers.....6-30	Own..	6-3¼x4½	117	32x4	1495	1545	....	2295	2445
Chalmers.....6-30	Own..	6-3¼x4½	122	33x4½	....	....	1795	....	....
Champion.....Tourist	Lyc..	4-3½x5	113	32x3½	....	1095	....	....	....
Champion.....Special	H-S..	4-3½x5	118	32x4	†1395	1395	....	....	....
Chandler.....Six	Own..	6-3½x5	123	33x4	1785	†1785	1785	2785	2885
Chevrolet.....490	Own..	4-3⅛x4	102	30x3½	625	625	....	975	975
Chevrolet.....FB	Own..	4-3⅛x5¼	110	33x4	975	975	....	1575	1575
Cleveland.....40	Own..	6-3 x4½	112	32x4	1295	1295	....	2195	2295
Climber Four	H-S..	4-3½x5	117		1450	1385	....	....	....
Climber Six.....S	H-S..	6-3¼x5	125½	32x4½	2250	2250	....	....	....
Cole.....870	Nort.	8-3½x4½	127	33x5	2550	†2695	2795	3695	3995
Columbia Challenger	Rut..	6-3½x5	115	32x4	....	1495	....	....	....
Columbia.....D-C&CS	Cont.	6-3¼x4½	115	32x4	1795	1795	....	2495	2595
Comet.....C-53	Cont.	6-3½x5¼	125	33x4½	....	2350	2450	....	3650
Commonwealth.....44	H-S..	4-3½x5	117	32x4	....	1395	....	....	2465
Crawford.....21-6-40	Cont.	6-3½x5¼	122½	32x4	3000	3000	....	....	4500
Crow-Elkhart....L63-65	Lyc..	4-3½x5	117	32x3½	‡1295	1295	....	....	2395
Crow-Elkhart....S63-65	H-S..	6-3¼x5	117	33x4	‡1545	1545	....	....	2395
Daniels.....D-19	Own..	8-3½x5¼	132	34x4½	‡5350	†5350	5350	6250	6950
Davis.....61-67	Cont.	6-3¼x4½	120	33x4	†1995	1895	†2150	2795	2795
Dispatch	Wisc.	4-3⅜x5	120	34x4	1250	1350	1350	1525	1575
Dixie Flyer.....H-S-70	H-S..	4-3½x5	112	32x4	1445	1445	....	2295	2345
Dodge Brothers	Own..	4-3⅞x4½	114	32x4	935	985	....	1585	1785
Dorris.....6-80	Own..	6-4 x5	132	33x5	....	†4785	4785	5800	6690
Dort.....17-12	D-Ly	4-3½x5	108	31x4	985	•985	....	1535	1685
Dupont.....A	Own..	4-3 x5½	124	32x4½	3400	†3400	....	....	4900
Elcar.....K-4	Lyc..	4-3½x5	117	33x4	1195	1195	....	....	....
Elcar.....7-R	Cont.	6-3¼x4½	117	33x4	†1595	1595	....	2395	2495
Elgin.....K-1	Falls.	6-3⅜x4¼	118	33x4	†1595	1495	....	2395	2395
Essex	Own..	4-3⅜x5	108½	32x4	1445	1445	....	1950	2300
Fergus.....S-5-21	Own..	6-3¼x5	126	33x4½	....	Chassi	s Price	8500	....
Ferris	Cont.	6-3½x5¼	130	32x4½	3350	....	2595	....	3675
Ford.....T	Own..	4-3⅜x4	100	30x3½	**370	††415	....	695	760
Franklin.....9-B	Own..	6-3¼x4	115	32x4	2550	2650	†2550	....	3650
Friend.....Four	Own..	4-3¼x4½	112	32x3½	‡1285	1285	....	1985	2085
Gardner.....G	Lyc..	4-3½x5	112	32x3½	‡995	‡995	....	....	1795
Globe.....B-10	Supre.	4-3⅜x5	115	32x4	....	....	....	....	....
Grant.....Six	Own..	6-3½x4½	116	32x4	1550	1550	....	2450	2450
H.C.S	Weid.	4-3⅝x5½	120	32x4½	2925	†2975	....	3650	3850
Halladay, Manh. Special	Rut..	6-3½x5	118	33x4	....	1695	....	....	....
Halladay, Craft Special	Rut..	6-3½x5	123	33x4	....	2295	....	....	....
Handley-Knight	Kn'ht.	4-4½x4½	125	32x4½	....	....	2850	....	4185
Hanson Six.....60	Cont.	6-3¼x4½	121	32x4	2185	2185	†2285	....	3165
Hanover Light	Own..	2-3½x4	190	28x3	345	....	....	....	....
Harroun.....A-A-2	Own..	4-3¼x5¼	106	30x3½	....	1195	....	....	....
Hatfield.....A-42	H-S..	4-3½x5	115	32x4	1495	1495	....	....	2395
Haynes.....75	Own..	6-3½x5	132	34x4½	2685	2485	2485	3185	3485
Haynes.....55	Own..	6-3½x5	121	33x4	1835	1785	....	....	2835
Haynes.....48	Own..	12-2¾x5	132	34x4½	4200	3635	3635	4650	4950
Huffman.....R	Cont.	6-3¼x4½	120	32x4	1845	1795	....	....	2775
Holmes.....Series 4	Own..	6-3½x4¼	126	34x4½	†2950	....	2950	3850	4150
Hudson Super 6	Own..	6-3½x5	126	34x4½	†2250	....	2250	3125	3250
Hupmobile.....Series R	Own..	4-3¼x5½	112	32x4	1485	1485	....	2400	2485
Jackson.....638	Cont.	6-3½x4½	121	32x4½	†2685	1950	....	3760	3760
Jordan.....M	Cont.	6-3¼x4½	120	32x4	2250	2250	....	3300	3300
Jordan.....F	Cont.	6-3½x5¼	127	32x4½	....	....	2475	....	3700
Kenworthy.....8-90	Own..	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
Kessler.....K	Own..	4-3⅝x3¾	117	32x4	....	1995	....	....	2445
King.....J	Own..	8-3 x5	120	32x4½	2740	†2725	*2725	....	4035
Kissel.....45	Own..	6-3½x5½	124	32x4½	2775	†2975	2475	3775	3775
Kline Kar.....6-55–K	Cont.	6-3¼x4½	121	33x4	2090	2090	2090	3250	3290
Kurtz Automatic.....A	H-S..	6-3¼x5	122	32x4	....	2050	....	....	3000
LaFayette.....134	Own..	8-3½x5¼	132	33x5	4850	4850	4850	6250	6500
Leach.....21-A-B&C	Cont.	6-3½x5½	128	32x4½	‡5700	5200	5700	....	....
Lexington.....Series S	Cont.	6-3¼x4½	122	32x4	....	1885	....	2750	3150
Lexington.....Series T	Anst..	6-3¼x4½	128	32x4½	....	....	2785	....	4150
Liberty.....13-C	Own..	6-3½x5	117	32x4	1595	1595	†1675	2400	2495
Lincoln	Own..	8-3⅜x5	130	33x5	4300	4300	4300	4950	5400
Locomobile	Own..	6-4½x5½	142	35x5	....	†8600	8600	....	....
Lorraine.....21-T	H-S..	4-3½x5	114	32x4	1665	1665	....	2590	2590

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Maibohm.....B	Falls..	6-3½x4¼	116	32x4	‡1575	$1575	†1750	$2395	$2395
Marmon.....34	Own..	6-3⅜x5½	136	32x4½	4185	†3985	3985	4875	5275
Maxwell.....25	Own..	4-3⅝x4½	109	30x3½	845	845	....	1445	1545
McFarlan.....1921	Own..	6-4½x6	140	33x5	6300	†6300	6300	7500	7500
Mercer.....Series 5	Own..	4-3⅜x6¾	132	32x4½	4500	†4500	*4500	5700	6200
Merit	Cont.	6-3¼x4½	119	32x4	2245	†2245	....	....	....
Meteor.....R&RR	Dues..	4-4¼x6	129	32x4½	5500	5500	....	....	....
Metz.....M6	Rut..	6-3½x5	120	32x4	1995	1995	....	2795	2895
Mitchell.....F-40	Own..	6-3¼x5	120	33x4	‡1490	1490	†1790	2590	2690
Mitchell.....F-42	Own..	6-3½x5	127	33x4	....	....	1995	....	....
Moller.....A	Own..	4-2⅝x4	100	27x3½	2000	....	....	....	....
Monroe.....S-9 & 10	Own..	4-3¼x4½	115	32x3½	1295	1295	....	....	....
Monroe.....S-11 & 12	Own..	4-3¼x4½	115	33x4	....	....	....	2075	2175
Moon.....6-48	Cont..	6-3¼x4½	122	32x4	2085	1985	2485	2985	2985
Murray-Mac Six	Own..	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash.....681-7	Own..	6-3¼x5	121	33x4	1525	1545	†1695	2395	2695
Nash.....682	Own..	6-3¼x5	127	34x4½	....	....	1695	....	....
Nash Four.....41-4	Own..	4-3¼x5	112	32x3½	1175	1195	....	1735	1935
National Sextet.....BB	Own..	6-3½x5¼	130	32x4½	2990	†2990	2990	3990	3990
Nelson.....D	Own..	4-3½x4¾	104	32x4	....	1900	....	....	....
Noma.....1C	Cont..	6-3¼x4½	128	32x4½	3000	†3200	....	....	4450
Northway	Own..	6-3½x5¼	128	33x5	4200	*4200	6000	5600	5400
Norwalk.....430-KS	Lyc..	4-3½x5	116	32x3½	....	1035	....	....	....
Oakland.....34-C	Own..	6-2⅛x4¾	115	32x4	1095	1145	....	1625	1725
Ogren.....6-60	Own..	6-3½x5¼	134	33x5	†3850	3750	3900	5000	5400
Oldsmobile.....43-A	Own..	4-3⅛x5¼	115	32x4	†1325	1345	....	1895	2100
Oldsmobile.....37A	Own..	6-2⅛x4¾	112	32x4	†1450	1450	....	2145	2145
Oldsmobile.....46	Own..	8-2⅞x4¾	122	33x4½	....	†1825	1875	....	2775
Oldsmobile.....47	Own..	8-2⅞x4½	115	32x4	....	†1725	....	2225	2425
Overland.....4	Own..	4-3⅜x4	100	30x3½	695	695	....	1000	1275
Packard.....Single-Six	Own..	6-3⅜x4½	116	33x4½	2975	2975	....	3750	3975
Packard.....Twin Six	Own..	12-3 x5	136	35x5	4850	*4850	4850	6600	6800
Paige.....6-42	Own..	6-3¼x5	119	32x4	1635	1635	....	2450	2570
Paige.....6-66	Cont.	6-3⅜x5	131	33x4½	†2975	‡3295	2875	3755	3830
Pan.....A	Own..	4-3½x5	108	33x4	....	1500	....	....	....
Pan American. E&F–6-55	H-S..	6-3½x5	121	33x4	2000	2000	2100	....	....
Parenti.....1921	Own..	8-2¾x4¼	125	32x4	....	2000	....	....	3000
Paterson.....650	Cont.	6-3¼x4½	120	33x4	....	1595	1625	2895	2895
Peerless.....56–S–7	Own	8-3½x5	125	34x4½	....	†2990	2990	3680	3950
Peters	Own.	2-3½x3⅜	90	28x3	385	....	....	....	....
Piedmont.....4-30	Lyc..	4-3½x5	116	32x3½	....	1270	....	....	....
Piedmont.....6-40	Cont.	6-3¼x4½	122	32x4	....	1495	....	....	....
Pierce-Arrow	Own..	6-4 x5½	138	33x5	8000	†7500	7500	8500	9000
Pilot.....6-45	Teetor	6-3½x	120	32x4	1945	1895	....	....	....
Pilot.....6-50	H-S..	6-3¼x5	126	32x4½	2285	2285	2335	3350	3400
Porter.....40	Own..	4-4⅝x6¾	142	35x5	6750	Chassi	s Price	....	....
Premier.....6-D	Own..	6-3⅝x5½	126¾	33x5	3790	†3690	3890	4690	5190
Premocar.....6-40 A	Falls..	6-3½x4¼	117	32x3½	....	1295	....	....	....
Raleigh.....A-6-60	H-S..	6-3¼x5	122	32x4½	2250	2250	....	3100	3200
R & V Knight.....R	Own..	4-3⅜x5	116	32x4	....	2150	....	2850	2950
R & V Knight.....J	Own..	6-3½x4½	127	32x4½	3350	†3350	3350	4000	4200
Reo.....T-6	Own..	6-3⅛x5	120	33x4	1850	1850	....	2700	2750
Revere.....C	Dues..	4-4½x6	131	32x4½	4850	4650	†4650	....	6500
Roamer.....6-54–E	Cont.	6-3½x5¼	138	32x4½	3150	†3150	3250	....	....
Rolls-Royce	Own..	6-4½x4¾	143½	33x5	U. S.	Chassi	s Price	11750	....
Romer	Cont.	6-3¼x4½	120	32x4	2000	2000	2100	2450	2750
Saxon.....125	Own..	4-3½x5	112	32x4	1545	1495	....	2295	2295
Sayers Six.....DP	Cont.	6-3¼x4½	118	33x4	2495	2195	....	....	3295
Scripps-Booth...B-39-42	Nort.	6-2⅛x4¾	115	32x4	‡1275	1295	....	1950	2100
Scripps-Booth	Cont.	6-3¼x4½	115	32x4	1470	1490	....	2350	2375
Seneca.....L & O	LeR..	4-3½x4½	108	30x3½	1045	1045	....	....	....
Severin.....Six	Cont.	6-3½x5¼	122	33x4	1485	1485	....	2100	2250
Severin.....Six	Cont.	6-3½x5¼	122	33x5	2550	2550	2550	3250	3350
Sheridan.....4	Nort.	4-3⅛x5¼	116	33x4	1485	1485	....	2060	2360
Skelton.....35	Lyc..	4-3½x5	112	32x3½	995	995	....	....	....
Southern Six.....660-2	H-S..	6-3¼x5	127	32x4½	2875	2875	2995	....	....
Standard.....J	Own..	8-3¼x5	127	34x3½	3400	†3400	3400	4500	4800
Stanley Steamer	Own..	2-4 x5	130	34x4½	2800	2600	2600	3775	3850
Stanwood Six	Cont.	6-3¼x4½	118	33x4	2050	2050	....	2950	....
Stearns.....SKL4	Own.	4-3⅞x5⅝	125	34x4½	2550	2450	2675	3400	3700
Stephens.....90	Own.	6-3¼x4½	122	33x4½	1900	†1985	2065	3100	3100
Stevens Duryea.....E	Own..	6-4½x5½	138	35x5	8500	†8000	8000	9500	9500
Studebaker.....EJ-40	Own..	6-3½x4½	112	32x4	1300	1335	....	1695	1995
Studebaker.....EH-50	Own..	6-3½x5	119	32x4	1585	1635	†1635	2450	2550
Studebaker.....EG-60	Own..	6-3⅞x5	126	33x4½	....	....	1985	....	....
Stutz	Own..	4-4½x6	130	32x4½	3250	†3350	*3350	4800	....
Templar.....A-445	Own..	4-3⅜x5½	118	32x4	2385	2385	....	3185	3185
Texan.....A-38	Lyc..	4-3½x5	115	33x4	1195	1195	....	....	....
Texan.....C-12	H-S..	4-3½x5	115	33x4	1350	1350	....	....	....
Tulsa.....E-1-2-3	H-S..	4-3½x5	117	33x4	1385	1385	....	....	....
Velie.....48	Cont..	6-3¼x4½	115	32x4	1585	1585	†1800	2485	2485
Velie.....34	Falls.	6-3½x4¼	112	32x3½	1385	1385	....	....	2085
Vogue.....6-55	H-S..	6-3¼x5	124	32x4	....	1885	1960	2785	2885
Vogue.....6-66	Cont..	6-3½x5¼	124	33x4½	....	2085	2160	2885	2985
Washington	Falls..	6-3⅛x4¼	116	32x4	....	1685	....	....	....
Wasp.....2611	Wisc..	4-4¾x5½	132	33x5	....	†5500	....	....	4590
Westcott.....C-48	Cont..	6-3½x5¼	125	32x4½	....	....	2990	....	3390
Westcott.....C-38	Cont..	6-3¼x4½	118	33x4	2290	2290	†2290	3390	3390
Wharton.....A	Curt..	8-4 x5	136	34x4½	....	†4885	4885	..	....
Wills Sainte Claire	Own..	8-3¼x4	121	32x4½	3275	3200	....	....	....
Willys-Knight.....20	Own..	4-3⅝x4½	118	33x4	1895	1895	....	2550	2750
Winther.....61	H-S..	6-3¼x5	120	32x4½	....	....	2750	....	....
Winton.....25	Own..	6-3⅜x5¼	132	35x5	4600	†4975	4600	5950	†5950

*—6-passenger. †—4-passenger. ‡—3-passenger. +Special Body. **—Price without starter and demountable rims. Price with starter and demountable rims $465. ††—Price without starter and demountable rims. Price with starter and demountable rims $510.

Engine Make: Anst.—Ansted. Cont—Continental. Curt—Curtiss. D.Ly—Dort Lycoming Dues.—Duesenberg. GBS—Golden, Belknap & Swartz. H-S—Herschell-Spillman. LeR—Leroi. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenber. Supr—Supreme. Tee—Teetor. Weid—Weidely. Wisc—Wisconsin. §—Model 47—34x4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾	$1650§	3¾x5	34x5†	34x5†	W
Acason, R	1	2260	3¾x5½	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5½	36x3½	36x6	W
Acason, H	2½	3295	4⅜x5⅜	36x4*	36x4d*	W
Acason, L	3½	4295	4⅜x5⅜	36x5*	36x5d*	W
Acason, M	5	5250	5 x6½	36x6	40x12	W
Ace, C	1½	2295	3¾x5½	34x3½*	34x5*	W
Ace, A	2½	2795	4¼x5½	36x4*	36x7	W
Acme, G	¾	....	3¾x5	35x5†	35x5†	W
Acme, B	1	....	3¾x5	34x3½	34x5	W
Acme, F	1½	....	3¾x5	34x3½	34x5	W
Acme, A	2	....	4½x5½	36x4	36x7	W
Acme, C	3½	....	4½x5½	36x5	40x10	W
Acme, E	5	....	4¾x6	36x6	40x12	W
Akr'nMulti-Trk	20	1	1995	4 x5¼	34x5	34x5	B
All-Power, C		3½	5800	4½x6	36x7	36x10	W
All-American, B-1		1	1795	3½x5	32x4	32x4	I
All-American C-1		1½	2195	3½x5	34x4	34x5	I
American, 25		2½	3350	4 x6	36x4*	36x4d*	W
American, 40		4	4275	4½x6	36x5*	36x5d*	W
Apex, G		1	1675	3½x5	33x5†	33x5†	I
Apex, D		1½	1915	3¾x5½	34x3½	34x4	I
Apex, E		2½	2695	4¼x5½	36x4	36x7	I
Apex, F		3½	3975	4½x6	36x5	36x10	I
Armleder, 20		1	....	3¾x5¼	34x3½*	34x5*	W
Armleder, HW		2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW		3½	....	4½x6	36x5	36x5d	W
Atco, B		1½	....	3¾x5¼	34x5†	36x6*	I
Atco, B1		1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A		2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D		1	....	3½x5	32x4½†	32x4½†	W
Atterbury, 20R		1½	2775	3¾x5	34x3½	34x5	W
Atterbury, 7CX		2½	3375	4⅛x5¼	36x4	36x4d	W
Atterbury, 7D		3½	4175	4½x5½	36x5	40x5d	W
Atterbury, 8E		5	5575	4¾x6	36x5	40x6d	W
Autocar, 21UF		1½-2	2300	4¾x4½*	34x4*	34x5*	D
Autocar, 21UG		1½-2	2400	4¾x4½*	34x4*	34x5*	D
Autocar, 26Y		...	4350	4¼x5½	34x5	36x10	D
Autocar, 26-B		....	4500	4¼x5½	34x5	36x10	D
Available, H1½		1½	2750	4 x5⅛	36x3½*	36x5*	W
Available, H2½		2½	3475	4 x5⅛	36x4*	36x8*	W
Available, H3½		3½	4475	4½x5½	36x5	40x5d	W
Available, H5		5	5375	4¾x6	36x6	40x12	W
Available, H7		7	6000	5 x6	36x6	40x14	B
Avery		1	...	3 x4	34x5†	34x5†	I
Beck, A. Jr.		1	1800	3¾x5	34x3½	34x4	I
Beck, C		2	2550	4½x5½	36x4	36x6	I
Bell, E		1½	2250	3¾x5¼	34x3½	34x5†	I
Bell, O		2½	2750	4½x5½	34x4	34x7	I
Belmont, D		2	2675	3¾x5	34x3½*	34x6*	D
Belmont, F		3½	3525	4 x6	36x5*	36x5d*	D
Bessemer, G		1	1395	3½x5	35x5†	35x5†	I
Bessemer, H-2		1½	1995	3¾x5	36x3½	36x5	I
Bessemer, J-2		2½	2595	4⅛x5¼	36x4	36x4	I
Bessemer, K-2		4	3495	4½x5½	36x6	36x10	I
Bethlehem, K		1	....	3½x5	34x4½†	35x5	I
Bethlehem, G		2	....	4 x5¼	34x3½*	34x6*	I
Bethlehem, H		3	....	4 x5¼*	36x4*	36x8	I
Bethlehem, J		4	....	4½x5½	36x5*	36x5d*	I
Ballstrom, 30		1½	2100	3¾x5¼	34x3½	34x6	I
Ballstrom, 50		2½	2860	4¼x5½	36x4	36x8	I
Ballstrom, 70		3½	3800	4½x6	36x5	36x10	I
Ballstrom, A-20		4	6000	5¾x7	40x8†	40x8†	I
Ballstrom, B21		4	5050	4½x5½	36x7	36x7	I
Bridgeport, A		1½	2350	3¾x5¼	34x3	34x6	W
Bridgeport, B		2½	2850	4¼x5½	36x4*	36x7*	W
Bridgeport, C		4	3650	4½x6	36x5	36x5d	W
Bridgeport, D		6	4500	4½x6	36x6	36x6d	W
Brinton, F		2½	3400	4⅛x5¼	36x4	36x7	W
Brockway, E		¾	1675	3¾x5	35x5†	35x5†	B
Brockway, S-4		1½	2250	3¾x5	36x3½*	36x5*	W
Brockway, K-5		2½	3200	4½x5½	36x4	36x7	W
Brockway, R-4		3½	4100	4½x5½	36x5	36x5d	W
Brockway, T		5	5250	4¾x6	36x6	40x6d	W
Capitol, G1½		1½	2975	3¾x5	35x5	38x7	W
Capitol, H2½		2½	3700	4¼x6	36x4	36x8	W
Capitol, K2½		2½	4250	4¼x6	36x6	42x9	W
Capitol, M3½		3½	4425	4¼x6	36x5	36x10	W
Case, ††		2	3000	4¼x5¾	36x6	38x7	I
Champion Light Commercia l		1½	1195	3¼x5	32x3½	32x3½	I
Chevrolet, G		¾	820	3¼x4	31x4†	34x4½†	B
Chevrolet, T		1	1225	3¼x5¼	33x4†	35x5†	W
Chicago, C1½		1½	....	3¾x5⅛	36x3½*	36x5*	W
Chicago, C2½		2½	....	4 x5⅛	36x4*	36x7*	W
Chicago, C3½		3½	....	4½x5½	36x5	36x10	W
Chicago, D5		5	....	4½x5½	36x6	40x12	W
Climber, A	20	1½	2450	3½x5	36x6*	38x7*	I
Clydesdale, 18		¾	1890	3¾x5	34x5	34x5	W
Clydesdale, 32C		1	2375	3¾x5½	34x3½*	34x5*	W
Clydesdale, 42C		1½	2475	4 x5½	36x3½	36x5	W
Clydesdale, 65C		2½	3250	4¼x5½	36x4	36x7	W
Clydesdale, 65EC		2½	3450	4½x5½	36x4	36x7	W
Clydesdale, 90C		3½	4100	4½x5½	36x5	40x10	W
Clydesdale, 120C		5	4500	4¾x6	36x6	40x12	W
Collier, 18		1	2350	3¾x5	34x4	34x5	W
Collier, 19		1½	2550	3¾x5	36x4	36x6	W
Collier, 21		2	2950	4⅛x5¼	36x4	36x7	W
Collier, 22		2½	3250	4⅛x5¼	36x4	36x4	W
Columbia, H		1½	2350	3¾x5	35x5†	34x5	I
Columbia, G		2½	2850	4 x5¼	36x4	36x7	I
Comet		1½	1950	3¾x5	34x4	34x4	W
Commerce, T		¾-1½	1450	3¾x5	34x4½†	34x4½†	B
Commerce, 12		1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16		2	2150	3¾x5	35x5†	35x6†	I
Concord, A		1½	2700	4 x5½	36x3½	36x6	W
Concord B		2½	3600	4½x5½	36x4	36x8	W
Concord AX		1½	3150	4 x5½	36x3½	36x6	W
Concord, BX		2½	3600	4½x5½	36x4	36x8	W
Cook, 41		2	$3000	4 x5½	36x6†	38x7†	I
Corbitt, E		1	2200	3¾x5	34x3½	34x4	W
Corbitt, D		1½	2600	3¾x5	36x3½	36x5	W
Corbitt, C		2	3150	4⅛x5¼	36x3½	36x7	W
Corbitt, B		2½	3300	4⅛x5¼	36x4	36x7	W
Corbitt, A		3½	4100	4½x5½	36x5	36x10	W
Corbitt, AA		5	5000	4¾x6	36x6	40x6d	W
Cyclone		1½	2800	3½x5	34x5†	36x6†	I
Dart, S		1½	....	3¾x5⅛	34x3½	34x6	W
Dart, M		2½	....	4¼x5½	36x4	36x7	W
Dart, W		3½	....	4½x6	36x5	36x10	W
Day-Elder, A		1	2225	3¾x5	34x3½	34x4	W
Day-Elder, B		1½	2425	3¾x5	34x3½	34x5	W
Day-Elder, D		2	2900	4⅛x5¼	36x4*	36x7	W
Day-Elder, C		2½	3125	4¼x5	36x4	36x7*	W
Day-Elder, F		3½	3950	4½x5½	36x5*	36x5d*	W
Day-Elder, E		5	4875	4½x6	36x5	36x6d	W
Dearborn, F		1½	2180	3¾x5⅛	34x4*	34x5*	W
Dearborn, 48		2	2590	3¾x5⅛	35x5†	34x7†	W
Defiance, G		1	1975	3¾x5	35x5†	35x5†	I
Defiance, D		1½	2550	3¾x5	35x5†	36x6†	I
Defiance, E		2	2750	3¾x5	35x5†	38x7†	I
DeKalb, E2½		2	2600	4⅛x5¼	36x4*	36x6*	W
DeKalb, E2		2½	2250	4⅛x5¼	34x3½*	36x5*	W
DeMartini 1½		1½	2600	3¾x5	34x3½	34x6	W
DeMartini 2		2	3300	4 x5½	36x3½	36x7	W
DeMartini 3		3	4250	4¼x5½	36x4	36x10	W
DeMartini 4		4	4800	4½x6	36x5	36x12	W
Denby, 12		1	1625	3¾x5	35x5	36x6	I
Denby, 33		1½	2300	3¾x5	35x5†	38x7†	I
Denby, 134		2	2600	3¾x5	36x3½	36x6	I
Denby, 25		3	3300	4⅛x5¼	36x4	36x7	I
Denby, 27		4	4200	4½x5½	36x5	36x5d	I
Denby, 210		5	4850	4½x5½	36x6	40x6d	I
Dependable, A		¾-1	1650	3½x5	34x5	36x6	W
Dependable, C		1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D		2	2650	4 x5½	34x5	36x6	W
Dependable, E		2½	2950	4¼x5½	36x4	36x7	W
Dependable, G		3½	3550	4½x6	36x6	38x7	W
Diamond-T, O		1	2500	3¾x5¼	34x5†	36x6†	W
Diamond-T, FS		1½	2960	3¾x5¼	36x3½	36x5	W
Diamond-T, T		1½	2650	3¾x5¼	36x3½	36x5	W
Diamond-T, U		2	3285	4 x5¼	36x4	36x7	W
Diamond-T, K		3½	4675	4¼x5½	36x5	36x5d	W
Diamond-T, EL		5	5400	4½x5½	36x6	40x6d	W
Diamond-T, S		5	5650	4¾x6	36x6	40x6d	W
Diehl, A		1	....	3½x5	34x4½	35x5	I
Diehl, B		1½	....	3½x5	36x6	36x6	I
Dispatch, F		1	1350	3¾x5	34x4†	34x4†	I
Doane		2½	4100††	4¼x5¾	36x5	36x7	C
Doane		3½	5100††	4⅜x5¾	36x5	36x5d	C
Doane		6	6000††	4¾x6¾	36x6	40x6d	C
Dodge Brothers		½	1035††	37x4½	33x4†	33x4†	B
Dorris, K-4		2	3400	4¼x5½	36x4	36x7	W
Dorris, K-7		3½	4400	4¼x5½	36x5	36x10	W
Double Drive B		3	4000	4¼x5½	6	6	W
Douglas G		1½	2050	3¾x5⅛	36x5	37x8*	W
Douglas I		3	3250	4¼x5½	36x6	37x8*	W
Duplex, A		1½	2775	4 x5¼	35x5†	38x7†	W
Duplex, E		3½	4250	4¼x5½	36x8	36x8	I
Duty, 21		2	1490	3½x5	34x3½	34x5	I
Eagle, 100-2		2	2275	3¾x5¼	34x4*	34x7*	I
Erie, A		2½	....	4¼x5½	36x4	36x4d	W
F.W.D., B		3	4200	4¾x5½	36x6	36x6	B
Facto, 1921		2½	2895	4¼x5½	36x4*	36x8*	W
Fageol, 1½		1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, 2½		2½	3900	4¼x5¾	34x4	36x7	W
Fageol 3½		3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, 5		5	5700	4½x6¼	36x6	40x6d	W
Famous, B10		1	1800	3½x5	36x3½*	36x4*	I
Famous, B12		1½	2100	3¾x5	36x3½*	36x5*	I
Fargo, R		2	2500	3¾x5	36x4	36x6	I
Federal, SD		1	2500	3¾x5	35x5†	36x6†	W
Federal, TE		1½	2725	4⅛x5¼	36x3½	36x5	W
Federal, UE		2	3025	4⅛x5¼	36x4	36x7	W
Federal, WE		3½	3950	4½x5½	36x5	36x5d	W
Federal, X 2		5-6	5350	4¾x6	36x6	40x6d	W
Ford, TT		1	495	3¾x4	30x3½*	32x4½*	W
Forschler, A		1	....	3½x5	34x3	34x4	W
Forschler, AX		1½	....	3½x5	36x3½	36x5	W
Forschler, B		2	....	4⅛x5¼	36x4	36x7	W
Forschler, BX		3	....	4½x5¼	36x4	36x8	W
Front Drive C		1½	2800	3¾x5½	5	4	W
Fulton, A		¾	1750	3½x5	35x5†	35x5†	B
Fulton, C		2	2350	3½x5	34x4	34x6	I
G & J**		2	3850	4x5¼	36x4	36x7	W
G & J**		3½	5175	4½x5½	36x5	36x5d	W
G.M.C., K15		¾	....	3½x5½	33x4½†	33x4½†	B
G.M.C., K16		1	....	3½x5½	34x5†	34x5†	B
G.M.C., K41		2	....	4 x5½	36x4*	36x7*	W
G.M.C., K71		3½	....	4½x6	36x5	40x5.1	W
G M.C.,K101		5	....	4½x6	36x5	40x6.1	W
G.W.W.		1½	2100	3¾x5½	35x5	35x5	I
Garford, 15		¾	1590	3⅜x5½	34x5†	34x5†	W
Garford, 25		1¼	2090	3¾x5⅛	36x3½	36x4	W
Garford, 70-H		2	3190	4¼x5½	36x4	36x7	W
Garford, 68D		5	5200	5 x6½	36x6	40x6d	W
Garford, 77D		3½	4390	4½x6	36x5	36x6.1	W
Garford, 150-A		7½	5500	5x6½	36x6	40x7d	C
Gary, F		1	2100	3¾x5	36x3½	36x4	W
Gary, I		1½	$2550	4 x5½	36x3½	36x5	W
Gary, J		2½	3150	4¼x5½	36x4	36x7	W
Gary, K		3½	4050	4½x6	36x5	40x5d	W
Gary, M		5	5150	5 x6½	36x6	40x6d	W
Gersix M		1½	3100	4 x5½	36x3½	36x7	W
Gersix K		2½	3500	4½x5½	36x4	36x8	W
Gersix		3½	4500	4½x6	36x5	40x12	W
Giant, 15-A		1½	2250	3¾x5	34x3½	34x5	W
Giant, 16		2	3150	4¼x5½	36x4	36x7	W
Giant, 17		3½	4150	4½x5½	36x5	36x5d	W
Globe D-20		¾	1495	3¾x5	33x4½†	33x4½†	B
Globe		1	1495	3¾x5	33x5	33x5	B
Golden West, GH		3	5000	4½x6	36x7	36x7	W
Golden West, G		3½	4500	4½x5½	36x6	36x6	W
Golden West, H		3½-4	5000	4½x6	36x6	36x6	W
Golden West, T		4	5500	4¾x6	36x6	36x6	W
Golden West, K		7	6000	5½x6	36x6	36x6	W
Golden West, HA		7	6000	4½x6	36x6	36x10	W
Gove, A-1		2½	....	4⅛x5¼	36x4*	36x7*	I
Graham Bros. A		1½	2495	3¾x5	35x5†	36x6†	I
Gramm-Bern., 10		1	1495§	3½x5	33x5†	33x5†	B
Gramm-Bern., 15		1½	2050§	3¾x5	36x3½*	36x5*	I
Gramm-Bern., 65		1½	2725§	3¾x5	36x3½*	36x5	W
Gramm-Bern., 20		2	3175§	4⅛x5¼	36x4*	36x7*	W
Gramm-Bern., 25		2½	3575§	4¼x5½	36x4*	36x4d*	W
Gramm-Bern., 35		3½	4375§	4½x5½	36x5	40x5d*	W
Gramm-Bern., 50		5	5275§	4¾x6	36x6	40x6d*	W
Hahn, J4		1	....	3¾x5	34x5*	34x5*	W
Hahn, CD		1½	....	4⅛x5¼	36x3½*	36x6*	W
Hahn, EE		2½	....	4½x5½	36x4*	36x8*	W
Hahn, F		3½	....	4½x5½	36x5*	36x10*	W
Hahn, EF		5	....	4¾x6	36x6	40x12	W
Hal Fur, E		1	2350	4 x5	35x5†	35x5†	W
Hal Fur, B		2½	3250	4¼x5½	35x5*	38x7*	W
Hal Fur, F		3½	4250	4½x5½	36x6†	40x10†	W
Hall		1½	3100	3¾x5	34x5†	38x7†	W
Hall		2½	3275	4⅛x5¼	36x4	36x6	W
Hall		3½	4100	4½x5½	36x5	36x5d	W
Hall		5	5100	4½x5½	36x5	40x6d	W
Hall		7	5100	4½x5½	36x5	40x6d	C
Harvey, WEA		1½	2550	4⅛x5½	34x3½	34x5	W
Harvey, WFA		2½	3300	4¼x5½	36x4	36x7	W
Harvey, WHA		3½	4300	4½x6	36x5	36x5d	W
Harvey, WKA		5	5200	4½x6	36x6	40x6d	W
Hawkeye, K		1½	1850	3¾x5¼	34x3½*	34x5*	I
Hawkeye, M		2	2650	4¼x5½	36x4*	36x6*	I
Hawkeye, N		3½	3700	4½x6	36x5*	36x10*	I
Hendrickson, N		2½	3150	4¼x5¾	36x4*	36x7*	W
Hendrickson, M		3½	3975	4¼x5¾	36x5*	36x5d*	W
Highway, Knight A		4	....	4 x6	36x5	36x6d	W
Highway, Knight B		5	....	4 x6	36x5	40x6d	W
Higrade, A17		¾	1850	3½x5	32x4½	32x4½	W
Higrade, A18		1	2100	3½x5	35x5†	35x5†	W
Higrade, B20		1½	2500	4⅛x5¼	35x4†	36x6†	W
Huffman, B		1½	1995	3¾x5	34x3½	34x6	W
Huffman, C		1½	1795	3¾x5⅛	34x3½	34x6	I
Hurlburt		1½	....	4 x5½	34x4	34x5	W
Hurlburt		2½	....	4¼x5½	36x4	36x4d	W
Hurlburt		3½	....	4½x6	36x5	36x5d	W
Hurlburt		5	....	4½x6	36x5	40x6d	W
Huron Erie		1½	2425	3¾x5¼	36x3½	36x5	I
Huron Mich.		2 2	2950	4¼x5½	36x4	36x7	I
Indep'd't(Iowa), G		1½	2010	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.),H.I.		2½	2910	4½x5¼	34x4	34x6	I
Indep'd't(Iowa), B		1	1665	3½x5	34x3½	34x4	W
Indep'd't(Ohio), F		1½	2585	3¾x5	36x3½	36x5	W
Indep'd't(Ohio) H		2½	3285	4⅛x5¼	36x4	36x4d	W
Indep'd't(Ohio) K		3½	4285	4½x5½	36x5	36x5d	W
Indiana, 12		1¼	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20		2	....	4⅛x5½	36x4*	36x7*	W
Indiana, 25		2½	....	4⅛x5½	36x4*	36x8*	W
Indiana, 35		3½	....	4⅜x5½	36x5*	36x5d*	W
Indiana, 51		5	....	5 x6¼	36x5*	40x6d*	W
Inland, D		2	2950	4 x5	34x5	34x6	I
International, S		¾	1500	3½x5	34x5†	34x5†	I
International, 21		1	1750	3½x5¼	36x3½	36x3½	I
International, 31		1½	1850	3½x5¼	36x3½	36x4	I
International, 41		2	2100	3½x5¼	36x3½	36x5	I
International, 61		3	2400	4¼x5	36x4*	36x6*	I
International, 101		5	3600	4¼x5	36x5	40x10	I
J & J, D		2	3250	4 x5	34x4*	34x6	I
Jackson, 4WD		3½	4550	4½x5½	36x7	36x7	B
Jumbo, 15		1½	2425	3¾x5¼	36x3½	36x5	I
Jumbo, 20		2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25		2½	3090	3¾x5¼	36x4	36x7	I
Jumbo, 30		3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35		3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40		4	4730	4 x6	38x7†	44x10	I
K-Z, 1		1	2250	3½x5	34x3½	34x5	W
K-Z, 1½		1½	2750	3¾x5	36x4	36x6	W
K-Z, 2½		2½	3250	4⅛x5¼	36x4	36x8	W
K-Z, 3½		3½	4250	4½x5½	36x5	40x10	W
K-Z, 5		5	5200	4½x5½	36x6	40x6d	W
Kalamazoo, G-1		1½	2495	3¾x5	34x4	34x5	W
Kalamazoo, G-2		1½-2	3100	3¾x5	36x4*	36x5*	W
Kalamazoo, H		2½	3700	4 x6	36x4	36x8	W
Kalamazoo, K		3½	4300	4¼x6	36x5	36x10	W
Karavan, A		2½	3900	4¼x6	36x4	36x8	W
Kearns, H		¾	1600	3¼x4½	32x4½†	32x4½†	I
Kearns, N		1½	2200	3½x5	34x3½	34x6	I
Kelly-Springfield K-31		1½	2900	3¾x5¼	36x3½	36x6	C
Kelly-S., K-34		1½	2900	3¾x5¼	36x3½	36x6	W
Kelly-S., K-36		2½	3250	3¾x5¼	36x4	36x4d	W
Kelly-S., K-35		2½	3250	3¾x5¼	36x4	36x4d	C
Kelly-S., K-40		3½	4200	4½x6½	36x5	40x5d	C
Kelly-S., K-41		3½	4200	4½x6½	36x5	40x5d	I
Kelly-S., K-42		3½	4200	4½x6½	36x5	40x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kelly-S., K-45	4	$4550	4½x6½	36x5	40x6d	C
Kelly-S., K-50	5	4900	4½x6½	36x6	40x6d	C
Kelly-S, K-60	6	5100	4½x6½	36x6	40x7d	C
Keystone, 40	2	2450	3¾x5½	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4¼x6	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x12	W
Kimball, AF	5	5975	5 x6	36x6	40x7d	W
Kissel, Express	1	1985††	37/8x5½	34x5†	34x5†	W
Kissel, Utility	1½	2775	37/8x5½	30x3½	36x5	W
Kissel, Freighter	2½	3475	4¼x5½	30x4	36x7	W
Kissel, H. D.	4	4475	4¼x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5¼	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, BB	2	3600	4½x5¼	36x4*	36x7*	W
Kleiber, B	2½	4200	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4900	4½x5½	36x5	36x5d	W
Kleiber, D	5	5600	5 x6½	36x6	40x12	W
Koehler, D	1½	....	3½x5	34x3½	34x5	W
Koehler, M	2½	....	4 x5½	36x4	36x7	W
Koehler, MCS	2½	....	4 x5½	36x4	36x7	W
Koehler, F	3½	....	4½x5½	36x5	36x10	W
Koehler, MT, Trac	5	....	4 x5½	36x4	36x7	W
L.M.C., 2-20	2½	2540	4½x5¼	36x4	36x4d	I
Lange, B	2½	3350	4½x5¼	36x4*	36x6*	C
Larrabee, U	1½	2460	3¾x5	34x3½	34x5	W
Larrabee, K	2½	3400	4½x5½	36x4	36x7	W
Larrabee, L	3½	4200	4½x5½	36x5	36x5d	W
Larrabee, W	5	5100	4¾x6	36x6	40x6d	W
Lion, L	1	2350	3¾x5½	35x5†	35x5†	W
Luedinghaus, C	1	2100	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2700	3¾x5¼	34x3½*	34x5*	W
Luedinghaus,	2-2½	3150	4¼x5¾	36x4*	36x7*	W
Maccar, L	1½	2925	4½x5¼	36x4	36x6	W
Maccar, H-2	2½	3750	4½x5½	36x4	36x4d	W
Maccar, M-2	3½	4500	4½x6	36x5	36x5d	W
Maccar, G	5	5500	4¾x6	36x5	40x6d	W
MacDonald, A	7½	5750	4½x6	40x7	40x14	I
Mack, AB D.R.,	1½	3450	4 x5	36x4	36x3½d	D
Mack, AB	2½	3400	4 x5	36x4	36x4d	C
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac., AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac., AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	4150	4 x5½	36x4	36x7	W
Mapleleaf, BB**	3	4775	4¼x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5770	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6825	4½x5½	36x6	40x6d	W
Master, JW	1½	2690	4½x5½	34x3½	34x5	W
Master, W	2½	3290	4½x5½	34x4	36x7	W
Master, D	2½	3540	4½x5½	34x4	36x7	D
Master, A	3½	4190	4½x6	36x5	40x5d	W
Master, E	3½	4610	4½x6	35x5	40x5d	D
Master, B	5	5290	4¾x6½	36x6	40x6d	W
Master, F	5	5440	4¾x6½	35x5	40x6d	D
Master Trac., T	6	3740	4¼x5½	36x7	36x4d	D
Maxwell, 1½	1½	1332	3⅝x4¼	32x3	32x4	W
Menominee, HT	1	2080	3¾x5	34x3½	36x5	W
Menominee, H	1½	2725	4 x5	36x3½	36x5	W
Menominee, D	2	3245	4 x6	36x4	36x8	W
Menominee, G	3½	4270	4½x6	36x5	36x10	W
Menominee, J3	5	5450	4¾x6	36x6	40x12	W
Moline, 10	1½	2450	3½x5	34x5†	36x6†	I
Moreland, 20N	1	2850	3¾x5	35x5†	36x6†	I
Moreland, 21B	1½	2800	4½x5¼	36x3½	36x6	W
Moreland, 21C	2½	3500	4½x5½	36x4	36x8	W
Moreland, 21H	3½	4600	4¼x6	36x5	40x5d	W
Moreland, 21J	5	5000	4¾x6	36c6	40x6d	W
Mutual, 2B	2	3450	4 x6	36x4	36x8	W
Mutual, 2BP	2½	4150	4 x6	38x7†	42x9†	W
Napoleon, 7	¾-1	1350	3½x5	38x4	33x4†	I
Napoleon, XX-7	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1863	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5½	35x5	36x6	I
Nash, 3018	2	2550	3¾x5¼	36x6	40x8	I
Nash, Quad.	2	3250	4¼x5½	40x8	40x8	I
*Nelson, F1½	1½	....	4⅛x5¼	36x3½	36x5	W
*Nelson, F2	2	....	4½x5¼	36x4	36x7	W
*Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
*Nelson FC5	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2-2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2585	3¾x5¼	30x3½	36x5	W
Noble, 40	2	2825	4 x5½	36x4	36x7	W
Noble, D50	2½	3150	4½x5½	36x4	36x8	W
Noble, E70	3½	4030	4½x6	36x5	36x10	W
Northway, B-2	2	3400	4 x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
Northwestern W	2	3300	4½x5¼	34x4	36x6	W
Northwestern WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk, 25E	1	1695	3½x5	34x3½	34x4	W
Norwalk, 35E	1½	2025	3½x5	34x3½	34x3½d	W
Norwalk 35E Spec	1½	2285	3¾x5¼	34x3½	34x5	W
O. K., K1	1½	2675	4 x5½	36x3½	36x5†	W
O. K., L1	2½	3450	4¼x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Ogden, A1	1½	$2550	3¾x5	36x3½	36x5	W
Ogden, E	2½	3250	4⅛x5¼	36x4	36x7	W
Old Hickory, W	1	2175	3¾x5	36x3½*	36x4*	W
Old Reliable, A	1½	2350	4 x5	34x4	36x6	W
Old Reliable, B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	3½	4250	4¼x6	36x5	36x5d	W
Old Reliable, D	5	5250	4¾x6	36x6	40x6d	W
Old Reliable, KLM	7	6000	4¾x6¼	36x6	40x7d	C
Oldsmobile Econ.	1	1500	3⅛x5¼	35x5†	35x5†	I
Olympic, A	2½	3500	4¼x5½	36x4	36x7	W
Oneida, A-9	1¼	2350	3¾x5½	36x3½	36x5	W
Oneida, B-9	1¾	2915	4 x5¼	36x4	36x7	W
Oneida, C-9	2½	3390	4 x5¼	36x4	36x7	W
Oneida, D-9	3½	4345	4½x5½	36x5	36x10	W
Oneida, E-9	5	5460	4½x5½	36x6	40x12	W
Orleans, A	1½	2750	3¾x5⅛	36x3½	36x5	W
Orleans, B	2½	3250	4x5⅛	36x4*	36x7*	W
Orleans, C	3½	3750	4½x5½	36x4½	36x8	W
Orleans, D	5	4250	4½x5½	36x6	40x8	W
Oshkosh, A	2	3750	3½x5	36x6†	36x6†	4
Oshkosh, AA	2	3850	3½x5	36x6†	36x6†	4
Oshkosh, B	2½	4150	4 x5⅛	38x7†	38x7†	4
Oshkosh, BB	2½	4300	4 x5⅛	38x7†	38x7†	4
Packard, EC	...	3500	4⅜x5½	30x4	36x7	W
Packard, ED	...	4100	4½x5½	36x5	36x5d	W
Packard, EF	...	4500	5 x5½	36x6†	40x6d†	W
Packard, EX	...	4000	4⅜x5½	36x6†	40x8†	W
Paige, 52-19	1½	2880	4 x5¼	34x3½	34x6	W
Paige, 54-20	2½	3400	4¼x5½	34x4	34x4d	W
Paige, 51-18	3½	4285	4½x5½	36x5	36x5d	W
Parker, F20	2	3500	4 x6	34x4	36x4d	W
Parker, J20	3½	4400	4½x6	36x5	40x5d	W
Parker, M20	5	5500	4⅜x6	36x6	40x6d	W
Patriot, Revere	⅜-½	1785	3¾x5	35x5†	35x5†	W
Patriot, Lincoln	1½	2450	4 x5¼	34x3½*	34x5*	W
Patriot, Washgt'n	2½	3450	4½x5½	36x4*	36x7*	W
Piedmont, 4-30	1½	1685	3½x5	34x4†	34x4†	W
Pierce-Arrow,	2	3750	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4950	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	5700	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1550	3⅜x4¼	32x4½†	32x4½†	W
Pittsburger, B 21	2½-3	3800	4½x5¼	36x5*	36x7*	W
Pony	¼	400	2¾x4	28x3†	28x3†	C
Power, F	1½	....	3¾x5¼	36x6	36x6	W
Power, C	3½	....	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Ramier, R-11	¾	2150	3½x5	35x5†	35x5†	W
Rainier, R-19	1	2350	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2600	3¾x5	34x3½	34x5	W
Rainier, R-18	2	2950	4⅛x5¼	34x4	34x6	W
Rainier, R20	2½	3600	4½x5¼	34x4	34x7	W
Rainier, R-15	3½	4500	4½x5½	36x5	36x5d	W
Rainier, R17	5	5250	4½x6	36x6	36x6d	W
Ranger, TK-20-2	2	....	3¾x5	36x6†	36x6†	W
Reo, F	¾-1½	1385	4⅛x4½	34x4½†	34x4½†	B
Reliance, 10A	1½	2500	4 x5½	36x3½	36x5	I
Reliance, 20B	2½	3200	4½x5½	36x4	36x4d	I
Republic, 75	¾	1395††	3½x5	32x4½	32x4½	I
Republic, 10	1	1695	3¾x5	35x5†	35x5†	I
Republic, 10Exp.††	1	2095	....	35x5†	35x5†	I
Republic, 11X	1½	2295	3¾x5	34x3½	34x5	I
Republic, 19	2½	2795	4⅛x5¼	36x4	36x7	I
Republic, 20	3½	3845	4½x5½	36x5	36x10	I
Riker, B	3	4600	4¼x6	36x5	36x5d	W
Riker, BB	4	4800	4¼x6	36x5	36x6d	W
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, C. D. W.	2	3300	4 x5	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	34x5	36x5d	W
Rowe, G. P. W.	3	5250	3¼x5‡	38x7†	42x9†	W
Rowe, HW	4	4500	4¼x6	36x5	36x6d	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Rumely, A	1½	2720	3⅜x5¼	36x3½	36x5	W
Samson, KO 15	¾	....	3¼x4	32x4	32x4	B
Samson, E 25	1¼	....	3¼x5½	35x5	35x5	B
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2590	3¾x5	34x4	34x6	W
Sandow, J	2½	3275	4½x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	3350	4½x5¼	36x4	36x4d	W
Sanford, 35	3½	4200	4½x5½	36x5	36x5d	W
Sanford, 50	5	5100	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3550	4¼x5½	36x4	36x7	W
Schacht, 2½-Ton	2½	3850	4¼x5½	36x4	36x4d	W
Schacht, 3½-Ton	3½	4350	4¼x6	36x5	36x5d	W
Schacht, 5-Ton	5	5350	4½x6	36x5	40x6d	W
Schwartz, A	1	1685	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2600	3¾x5¼	34x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 1½A	1½	2360	3¾x5	34x3½	34x5	W
Selden, 2½A	2½	3425	4½x5¼	36x4	36x7	W
Selden, 3½A	3½	4175	4½x5½	36x5	36x10	W
Selden, 5A	5	5600	4¾x6	36x6	40x12	W
Seneca, M	½	1020	3¼x4½	30x3½†	30x3½†	B
Service, 15	¾-1	1840	3⅜x5	34x4½	35x5	B
Service, 220	1	2415	3½x5½	34x3½	34x5	W
Service, 31	1½	2985	4 x5½	36x3½	36x6	W
Service, 36	1½	3415	4¼x5½	35x5†	38x7†	W
Service, 51	2½	3475	4¼x5½	36x4	36x7	W
Service, 71	3½	$4285	4¼x5½	36x5	36x5d	W
Service, 76	3½	4485	4½x6	36x5	36x5d	W
Service, 101	5	5275	4½x6	36x6	40x6d	W
Signal, NF	1	2475	4¾x5	34x5†	36x6†	W
Signal, H	1½	2925	4⅜x5½	34x4	36x6	W
Signal, J	2½	3275	4⅜x5½	34x4	36x8	W
Signal, M	3½	4275	4½x5½	36x5	40x5d	W
Signal, R	5	5300	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x3½	34x4	W
Southern, 15	1½	2590	3¾x5½	36x6†	34x4	W
Southern, 20	2	2990	4¾x5¼	36x6†	40x8*	W
Standard, 1-K	1-1½	1950	3¾x5	34x3½*	34x5*	W
Standard, 76	2½-3	3100	4⅛x5¼	36x4*	36x7*	W
Standard, 66	3½-4	4000	4½x5½	36x5	36x10	W
Standard, S-K	5-6	5250	4¾x6	36x6	40x12	W
Sterling, 1½	1½	3200	4 x5⅜	36x3½	36x5*	W
Sterling, 2	2	3500	4 x5¾	36x4	36x6	W
Sterling, 2½	2½	3650	4⅜x5¾	36x4*	36x4d*	W
Sterling, 3½	3½	4650	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	5500	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	6000	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6500	5 x6¼	36x6	40x7d	C
Stewart, 11	¾	1350	3½x4½	32x4†	32x4†	I
Stewart, 15	1	1875	3½x5	35x5†	35x5†	I
Stewart, 9	1½	2200	3¾x5	34x3½	34x5	I
Stewart, 7	2	2800	4⅛x5¼	34x4	34x7	I
Stewart, 7-X	2½	2950	4¼x5½	34x4	34x7	I
Stewart, 10	3½	3850	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5½	36x4	36x7	W
Stoughton F	3	3600	4¼x5½	36x5d	36x5d	W
Sullivan, E	2	3350	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	4650	4½x6	36x5	36x5d	W
Superior, D	1	1650	3¾x5	34x4½†	34x4	I
Superior, E	2	2600	4⅛x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Tiffin, GW	1½	2095	4⅛x5¼	36x3½	36x5	W
Tiffin, MW	2½	3580	4½x5¼	36x4	36x3½d	W
Tiffin, PW	3½	4760	4½x5½	36x5	40x5d	W
Tiffin, F50	5	5850	4¾x6	36x6	40x6d	W
Tiffin, F60	6	6050	4¾x6	36x6	40x12	W
Titan, HT	3½	4550	4½x6	34x4*	40x5d	I
Titan, HD	5	5400	4½x6	36x5	40x6d	I
Titan, TS	2½	3400	4¼x5½	34x4*	36x4d	I
Tower, J	1½	3000	4⅛x5¼	35x5	38x7	W
Tower, H	2½	3475	4½x5¼	36x4	36x7	W
Tower, G	3½	4400	4½x5½	36x5	36x5d	W
Traffic, C	...	1595	3¾x5	34x3½*	34x5*	I
Transport, 20	...	1850	3¾x5⅛	34x3½	34x4	I
Transport, 30	1½	2250	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	4195	4½x6	36x5	36x10	I
Traylor, B	1½	2500	3¾x5⅛	34x3½	34x5	W
Traylor, C	2	3000	4 x5½	36x4	36x7	W
Traylor, D	3	3500	4¼x5½	36x4	36x8*	W
Traylor, E	4	4700	4½x6	35x5	40x10	W
Traylor, F	5	5100	4½x6	36x6	40x6d	W
Triangle, AA	¾-1	1600	3¼x5	35x5†	35x5†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5¾	36x4*	36x7*	I
Triumph, G	1	1995	3⅞x5⅛	34x5†	34x5†	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, HB	2	2900	3¾x5¼	36x4	36x7	W
Twin City, B.W.	2	3000	4 x5½	36x4	36x7	I
Twin City, A. W.	3½	4400	4¼x6	36x5	40x5d	W
Twin City, FWDB	3½	4750	5⅛x6	36x6	36x6	I
Twin City, FWDA	5	5250	5⅛x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½	*36x6*	W
Ultimate, AJ	2	3250	4¼x5½	35x5†	38x7†	W
Ultimate, B	3	3750	4¼x5½	36x4*	36x4d*	W
Ultimate, BL	3	3850	4¼x5½	36x4*	36x4d*	W
Union, F W	2½	3490	4 x6	36x5*	36x8*	D
Union, H W	4	4485	4½x6	36x6	40x12	D
Union, J W	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½*	34x5*	I
United, B	2½	3150	4¼x5½	36x4*	36x7*	I
United, C	3½	3975	4¼x5½	36x5	36x5d	I
United, V	5	5000	4½x6	36x6	40x6d	I
U. S., N	1½	2475	3¾x5	36x3½*	36x5*	I
U. S., R	3	3795	4 x5¼	36x4	36x4d	W
U. S., S	4	4595	4½x5½	36x5	36x5d	W
U. S., T	6	5850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	2200	3¾x5	36x3½	36x5	I
Veteran, E**	1-1½	3500	3¾x5¼	35x5†	36x6†	W
Veteran, A**	2-2½	4000	4¼x5½	36x4*	36x7*	W
Veteran, D**	2½-3	4100	4¼x5½	36x4*	36x7*	W
Veteran, H**	3½-4	5600	4¼x6	36x5	36x5d	W
Victor, A	1½	2050	3¾x5	34x4	34x5	I
Vim, 29	½	1355	3½x4½	31x4†	31x4†	W
Vim, 30	½	1550	3½x4½	32x4½	32x4½	W
Vim, 31	1	2475	3¾x5⅛	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5½	36x4	36x6	W
Vim, 23	3	3950	4¼x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4500	4¼x6	36x6	40x8	W
Walker-Johnson, B	2½	3500	4¼x5½	36x4	36x8	W
Walter, S	5	5600	4½x6¼	36x6	40x6d	D
Waltham, E	1½	2350	3¾x5¼	36x6†	38x7†	W
Ward-LaF., 2B	2½	3590	4⅜x5¾	36x4	36x7	W
Ward-LaF., 4A	3½	4690	4½x6¼	36x5	36x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body, §—Price includes several items of equipment.

*Nelson Le Moon

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Ward-LaF., 5A	5	$5590	5 x6½	36x6	36x6d	W
Watson, E	1	1865	3¾x5½	34x4½†	34x4½†	W
Watson, N	3½	4250	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5¼	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2400	3¾x5⅛	34x5†	34x5†	B
White, 20	2	3250	3¾x5⅛	36x4*	36x7	D
White, 40	3½	4200	3¾x5¾	36x5	40x5d	D
White, 45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick., E	1	2450	3¾x5	34x5†	34x5†	W
White Hick., H	1½	2750	3¾x5	36x3½	36x5	W
White Hick., K	2½	3350	4½x5¼	36x4	36x5	W
Wichita, K	1	2300	3¾x5¼	36x3*	36x4*	W
Wichita, L	1½	2600	3¾x5¼	36x3½*	36x5*	W
Wichita, M	2	2800	3¾x5¼	36x3½*	36x6*	W
Wichita, R	2½	3000	3¾x5¼	36x4*	36x7*	W
Wichita, RX	2½	3600	4¼x6	36x4*	36x8*	W
Wichita, O	3½	$4000	4¼x6	36x5*	36x5d*	W
Wichita, S	5	5000	4½x6	36x6	40x6d	W
Wilcox, AA	1	2100	3¾x5½	36x4*	36x4*	W
Wilcox, B	1½	2775	4¼x5	36x4	36x5	W
Wilcox, D	2½	3300	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	4250	4½x6	36x5*	36x5d*	W
Wilcox, F	5	5200	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2270	3¾x5	36x3½	36x5	W
Wilson, EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson, G	3½	3685	4½x5½	36x5	36x5d	W
Wilson, H	5	4520	4¾x6	36x6	40x6d	W
Winther, 751	¾	1795	3½x5	34x4½†	35x5†	I
Winther, 430	1½	$2850	3¾x5	32x4	32x4	I
Winther, 39	1½	2450	3¾x5	34x3½	34x5	I
Winther, 49	2	3250	4 x5	34x4	34x4d	I
Winther, 70	3½	4200	4 x6	36x5	36x5d	I
Winther, 450	4	3690	4 x5	34x5	36x6	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Wisconsin B	1	1950	4 x5¾	34x5†	34x5†	W
Wisconsin C	1½	2250	4⅝x5¾	34x5†	36x6†	W
Wisconsin D	2½	3500	4½x6¼	36x6	36x10	W
Wisconsin E	3½	4000	5 x6¼	36x6†	36x12†	W
Witt-Will, N	1½	2750	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	3250	4½x5¼	36x3½*	36x7*	W
Wolverine, J	1	2125	3½x5	34x3	34x4	I
Wolverine, J	1½	2375	3¾x5	34x3½	34x5	I
Wolverine, J	2	2640	3¾x5	34x4	34x7	I
Wolverine, J	2½	3425	4⅛x5¼	36x5	36x10	I
Wolverine, L	3½	4100	4½x5½	36x5	36x10	I
Yellow Cab M21	¾	2050	3¾x5	32x4	32x4	B
Yellow Cab M41	1¼	2350	3¾x5	34x4½	34x4½	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	16-30	$1975	3	Clim.	4-5 x6½	GDK	3-4
Allis-Chalm..B	6-12	925	2	LeIt.	4-3⅛x4½	Gas.	1
Allis-Chal.G.P	6-12	850	2	LeIt.	4-3⅛x4½	Gas.	1-2
Allis-Chalm.	12-20	1495	2	Mid.W	4-4⅛x5¼	Gas.	2-3
Allis-Chalm.	18-30	2150	4	Own	4-4¾x6½	GorK	3-4
Allis-Chalm	10-18	875	4	Own	4-4¾x6½	G,K	4
Allwork...2-G	14-28	1875	4	Own	4-4¾x6	GorK	3
Allwork...C	14-28	1675	4	Own	4-5 x6	GorK	3
AndrewsKio.D	18-36	2500	4	Clim.	4-5 x6½	GorK	4
Appleton	12-20	1500	4	Buda	4-4¼x5½	G,K	2-3
Aro...1921	3-5	550	4	Own	1-4½x5	Gas.	1
Aultman-T.	15-30	2200	4	Clim.	4-5 x6½	G,K	4
Aultman-T.	22-45	3850	4	Own	4-5½x8	G,K	6
Aultman-T.	30-60	5000	4	Own	4-7 x9	G,K,D	8
Automot. B-3.	12-24	1785	4	Herc.	4-4 x5⅛	Gas.	2-3
Avery.SR.Cul	5-10	....	4	Own	4-3 x4	G,K	..
Avery...Cult-C		....	3	Own	6-3 x4	G,K	..
Avery...B	5-10	....	4	Own	4-3 x4	G,K	2
Avery...C		....	4	Own	6-3 x4	G,K	..
Avery	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery	12-20	....	4	Own	4-4⅜x6	G,K,D	2-3
Avery	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery	14-28	....	4	Own	4-4⅜x7	G,K,D	3-4
Avery	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery	25-50	....	4	Own	4-6½x7	G,H,D	5-6
Avery	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates Mule.H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule..F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
Bates Mule G	25-35	....	*2	Midw	4 4½x6	Gas.	com.
Bean	8-16	....	*1	Own	4-3⅞x4	G,K	2-3
Beeman...G	2-4	315	4	Own	1-3½x4½	Gas.	½
Best	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best	60	....	*2	Own	4-6½x8½	G,K,D	8-9
Boring...1921	....	1850	3	Wauk	4-4⅜x5¾	GorK	2
Burn-Oil.1921	15-30	1650	4	Own	2-6¾x7	Ker.	3-4
Capital	15-30	1000	2	Own	4-4⅜x6	Gas.	3
Case	10-18	1090	4	Own	4-3⅞x5	GorK.	2
Case	15-27	1680	4	Own	4-4½x6	GorK	3
Case	22-40	3100	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	....	*2	Own	4-4½x6	Gas.	4
Caterpillar T16	40	....	*2	Own	4-6½x7	Gas.	6
Centaur	5-21½	455	2	N Way	2-4½x4½	G or K	1-9
Chase	12-25	2100	3	Buda	4-4¼x5½	GorK	2-3
Chicago...40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac...W	12-20	1495	*2	Own	4-4 x5½	G,K,D	2-3
Dakota...4	15-27	1750	3	Dom.	4-4¾x6	Gas.	3
Dart...B.J.	15-30	2100	4	Buda	4-4½x6	Gas.	3-4
Depue...A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill...D	20	2480	4	Cont.	4-4½x5½	Gas.	3
Dill...R.W.	20-	2980	4	Midw.	4-4½x6	Gas	3
Do-It-All	-7	595	..	Own	1-4½x5	Gas.	..
Eagle...F	12-22	1390	4	Own	2-7 x8	GorK	3-4
Eagle...F	16-30	1850	4	Own	2-8 x8	GorK	4-5
E-B...AA	12-20	1445	4	Own	4-4¾x5	GorK	3
E-B...Q	12-20	925	4	Own	4-4¾x5	GorK	3
E-B	16-32	2000	4	Own	4-5¼x7	GorK	4
Evans	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol...D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4
Farquhar	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City	20-35	....	4	Own	4-5¼x6	Ker.	4-6
Flour City	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City	40-70	....	4	Own	4-7½x9	Ker.	8-1
Fordson	.. 20	625	4	Own	4-4x5	G,K	2
Fox...E	20-40	3100	4	Own	4-5½x7½	G or K	4
Franklin...G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-3
Franklin...C	18-30	3350	*2	Clim.	4-5x6½	G or K	3-4
Franklin...G 2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick...A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick...C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
G-O...G	14-28	1485	4	Wauk.	4-4½x5¾	GorK	3
Grain Belt...A	18-36	2150	4	Wauk.	4-4¾x6¾	GorK	4
Gray...1920	18-36	$2000	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog	19-31	2000	4	Erd.	4-4 x6	GorK	3
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K.	4
Hart-Parr..20	20	995	4	Own	2-5¼x6½	K.D	3
Hart-Parr..30	30	1595	4	Own	2-6½x7	K,D	3
Heider...D	9-16	1170	4	Wauk	4-4½x5¾	G,K	2*
Heider...C	12-20	1395	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	6-10	1050	4	LeR.	4-3½x4½	Gas.	1
Hicks	20-30	....	4	....	4-4½x6	KorG	4
Huber Light 4	12-25	1185	4	Wauk	4-4½x5¾	GorK	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas.	3
Illinois, Super-Drive...C	18-36	2500	4	Clim.	4-5 x6½	G,K	4
Imperial...E	40-70	5000	4	Own	4-7½x9	G,K,D	10
Indiana...F	5-10	....	2	LeR.	4-3½x4½	Gas.	1-2
International.	8-16	900	4	Own	4-4½x5	G,K,D	2
International.	15-30	1750	4	Own	-5¼x8	G,K,D	4
J-T...N	20-40	3485	*2	Chief	4-4¾x6	G,K,D	3-4
Klumb...F	16-32	1650	4	Clim.	4-5 x6½	....	..
Knudsen, 1920	25-45	2500	4	Own	4-5 x9	Gas	4-6
LaCrosse...M	6-12	900	4	Own	2-4 x6	G,K	1
LaCrosse...G	12-24	1250	4	Own	2-6 x7	GorK	3
Lauson	12-25	1495	4	Midw.	4-4½x5¼	Gas.	3
Lauson	15-25	1685	4	Beav.	4-4½x6	GorK	3-4
Lauson...21	15-30	1985	4	Beav.	4-4¾x6	GorK	3-4
Leader...B	12-18	1095	4	Own	2-6 x6¼	G,K,D	2-3
Leader...N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader...GU	18-35	2775	*2	Clim.	4-5x6½	G,K	3-4
Leonard...E	20-30	2530	4	Buda	4-4½x6	G,K	3
Liberty...A	18-32	2475	4	Clim.	4-5 x6½	G,K	4
Linn...H4J	40-	4500	*	Cont.	4-4½-5½	Gas	4
Linn...W	60	5100	*	Wauk.	4-5 x6¼	Gas.	6
Little Giant..B	16-22	2200	4	Own	4-4½x5	K.	4
Little Giant..A	26-35	3300	4	Own	4-5½x6	K.	6
Lombard	85-150	....	*2	....	6-5½x6¾	Gas.	16
Lombard	50	....	*2	....	4-4¾x6½	....	6-10
Magnet...B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Master Jr	5-10	585	..	LeR.	-2¾x4	Gas.	1
MerryGar1921	2	230	2	Evin	1-2⅝x2½	Gas.	..
Minne...All-P	12-25	1230	4	Own	4-4½x7	GorK	3
Minne. Gen.P.	17-30	1850	4	Own	4-4¾x7	GorK	3-4
Minne. Med.Duty	22-44	3300	4	Own	4-6x7	GorK	5-6
Minne. HeavyDuty	35-70	4600	4	Own	4-7½x9	GorK	8-9
Mohawk.1921	8-16	785	4	Light	4-3¼x4½	KorG	1-2
Moline Univ D	9-18	1075	2	Own	4-3½x5	Gas.	2-
Moline Orch.	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Motor Macult.	1½	195	2	Own	1-2¾x3½	Gas.	..
Motox	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
NB...1	3-6	425	4	Own	2-3¼x4	Gas.	¾
NB...2	3-6	425	4	Own	2-2¾x4	Gas.	¾
Nichols-Shep. ...20-42	20-42	3100	4	Own	8 x10	GorK	3-6
Nichols Shep. ...25-50	25-50	3460	4	Own	9 x12	GorK	4-7
Nilson Jr...E	15-25	1775	4	Wauk	4-4¼x5¾	G or K	3
Nilson Senior	20-40	2475	5	Wauk	4-5 x6¼	G,K	4
Oil Pull...K	12-20	1485	4	Own	2-6 x8	K.D	3
Oil Pull...H	16-30	2285	4	Own	2-7 x8½	K.D	4
Oil Pull...G	20-40	3175	4	Own	2-8 x10	K.D	5-6
Oil Pull...E	30-60	4590	4	Own	2-10x12	K.D	8-10
Oldsmar GarK	2½-5	395	4	Own	1-5½x5½	Gas.	2½
Oliver...A	15-30	....	*2	Beav.	4-4½x6	GorK	3-4
Once Over Tiller Mark..6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett...K	15-30	1950	4	Pitt	4-4½x6	G,K	3
Peoria...L	12-25	1785	4	Clim.	4-5 x6½	G,K	3
Pioneer...G	18-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer...C	30-60	....	4	Own	4-7 x8	Gas.	10
Planet Jr	5-10	950	2	LeRoi	4-3½x4½	Gas	1
Plowman...A	15-30	1995	4	Buda	4-4½x6	G,K	3-4
Port Huron..A	12-25	$1700	4	Chief	4-4¾x6	G,K	3
Post...D	12-20	1800	4	Wauk	4-4¼x5¾	GorK	2
Prairie Dog..L	9-18	650	3	Wauk	4-3¾x5¼	Gas.	2
Prairie Dog..D	15-30	1250	4	Wauk	4-4½x6¼	Gas.	3
Ranger Cul. T-20	8-16	....	4	LeR.	4-3½x4½	Gas.	1
Reed	15-30	2250	4	Dom	4-4¾x6	K.	3-4
Reed...A-1	18-36	2400	4	Dom	4-5 x6	Gas.	4
Reliable	10-20	985	4	Own	2-6 x7	Ker.	2
Rex	12-25	1600	4	Wauk	4-4½x5¾	GorK	3
Russell	12-24	1500	4	Own	4-4½x5¾	GorK	2-3
Russell	15-30	2200	4	Own	4-5 x6½	GorK	3-4
Russell	20-35	3000	4	Own	4-5½x7	GorK	4-5
Russell	30-60	5000	4	Own	4-8 x10	GorK	8-10
Samson...M	.....	995	4	Nov.	4-4 x5½	G,K	2
Sandusky...J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com	6-12	....	2	LeR.	4-3½x4½	Gas.	10
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby...D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Shelby...C	10-20	....	4	Erd.	4-4 x6	GorK	2-3
Short Turn	20-40	1500	3	Beav.	4-4¾x6	G,K	3
Square T...A	18-35	2075	3	Clim.	4-5 x6½	K,G	3
Steady Pull	12-24	1485	4	....	4-4 x5	Gas.	3
Stinson...4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone	20-40	2250	4	Beav.	4-4¾x6	G,K	4
Tioga...3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Titan	10-20	900	4	Own	2-6½x8	G,K,D	3
Topp...B	30-45	3500	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro Cultivator	6-10	....	3	LeR.	4-3½x4½	Gas.	2
Townsend	10-20	1200	2	Own	4-6½x7	Ker	2-3
Townsend	15-30	1800	2	Own	4-7 x8	Ker	3-4
Townsend	25-50	3000	2	Own	4-8½x10	Ker	4-8
Traction Motor	40-50	....	4	....	8-3½x5	Gas.	4-5
Traylor...TB	*6-12	715	4	LeR.	4-3½x4½	Gas.	1
Triumph...H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar...10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Turner...1921	14-25	1295	4	Buda	4-4½x5½	G,K	3
Twin City	12-20	....	4	Own	4-4¼x6	G,K	3
Twin City	20-35	....	4	Own	4-5½x6¾	G,K	5
Twin City	40-65	....	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Universal	1-4	475	2	Own	1-3½x5	G	1
Utilitor...501	2½-4	380	4	Own	1-3½x4½	G	5-6
Velie..Biltwell	12-24	1750	4	Own	4-4½x5½	G,K,D	3
Victory...1921	9-18	1350	4	Gray.	4-3½x5	Gas.	2
Victory...1921	15-30	1750	4	Wauk	4-4½x5¾	Gas.	3
Vim...B	15-30	1650	4	Wauk	4-4¾x5¾	G,K	3
Wallis...K	15-25	1600	4	Own	4-4¼x5¾	G,K	3
Waterloo...N	12-25	....	4	Own	2-6½x7	G,K	3
Webfoot...53	28-53	5250	*2	Wisc.	4-5¾x7	G,D	6
Wellington..B	12-22	900	4	Erd.	4-4 x6	Ker.	2-3
Wellington..F	16-30	1400	4	Chief	4-4¾x6	Ker.	3-4
Western. 1920	16-32	2100	4	Clim.	4-5x6½	Gas.	4
Wetmore	12-25	1650	4	Wauk	4-4 x5¾	G,K	3
Wharton...E	12-20	1800	3	Buda	4-4¼x5½	Gas.	2
Whitney	9-18	1175	4	Own	2-5½x6½	Gas.	2
Wichita...T	15-30	2500	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	Ker.	4
Wisconsin...H	22-40	3200	4	Clim.	4-5½x7	Ker.	5
Yuba...15-25	15-25	2945	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba...25-40	25-40	4892	*2	Wisc	4-5¾x7	G,K,D	..
Zelle	12-25	....	4	....	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline, K—Kerosene, D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make; Beav.—Beaver, Clim.—Climax, Cont.—Continental, Dom.—Domas, Evin.—Evinrude, Herc.—Hercules, LeR.—LeRoi, Midw.—Midwest, Nway.—New Way, Nor.—Northway, Strns.—Stearns, T.C.—Twin City, Wauk.—Waukesha, Weid.—Weidely, Wis.—Wisconsin, *—Crawler type. All others are wheel type.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Toronto, Canada	Motor Car Festival	Aug. 10 to 13
Denver	National Motor Show	Aug. 27
Toronto, Canada	Canadian National Exposition	Aug. 29—Opens
Indianapolis	Automobile and Accessory Show	Sept. 6-10
Cincinnati	Fall Automobile Show	Oct. 1-8
Olympia, England	Automobile Show	Nov. 3-12
Chicago	Automotive Equipment Show	Nov. 14-19
New York	Automobile Salon	Nov. 27-Dec. 3
Chicago	Automobile Salon	January, 1922
New York	National Automobile Show	Jan. 7-13, 1922
Chicago	National Automobile Show	Jan. 28-Feb. 3, 1922
Minneapolis	Tractor Show	Jan. 30 to Feb. 4, inclusive

RACES

Cotati, Calif.	Opening of New Speedway	August 14
Pikes Peak	Hill Climb	September 5
Uniontown Speedway	Annual Autumn Classic	September 5
Los Angeles	Speedway Race	November 24

FOREIGN SHOWS

Buenos Aires, Argentina	Passenger Cars and Equipment	September
Luxemburg	Luxemburg Agricultural Sample Exhibition	September
Paris, France	Paris Motor Show	October 5-16
London	British Motor Show, Society Motor Mfgs. and Traders	Nov. 4-12

CONVENTIONS

Chicago	Twentv-eighth Annual Convention National Implement & Vehicle Association	Oct. 12-24
Cleveland	National Tire Dealers' Association	November
Chicago	Chicago Semi-Annual Convention of Factory Service Managers N. A. C. C	Nov. 22-24
New York	Service Managers Convention	Nov. 22-24

Business Notes

Ace Motor Car Co., Milwaukee, has been organized to act as distributor of the Ace. A. J. Sibben is general manager.

The Pacific Nash Motor Co. has been granted the franchise for the Lafayette line of cars for northern California and Nevada.

The Automotive Supply Co., Springfield, O., has been organized to take care of the wholesale business of the H. G. Root Co. J. L. Zismer was elected president and treasurer and L. W. Peaz, secretary. Besides these men the directors are H. G. Root, general manager of the Westcott Motor Car Co., J. Stanley Weigel and W. C. Webster. The new company will take over the business Aug. 1.

Goodyear Tire & Rubber Co. dealer sales for the week ending July 16, were the largest in the history of the company, officials report, with sales to dealers of more than 72,000 complete tire units. The Akron Goodyear factories now are on a basis of 23,200 tires daily, while the California plant has increased production 4 per cent since April and is making 3,500 tires daily. This gives the company 86 per cent of peak production.

March Motors Co., Milwaukee, for many years distributor of the Mitchell, has been discontinued, following the recent death of Alton J. March, president and general manager. The building has been taken over by the Milwaukee Oldsmobile Sales Co., Olds dealer in Milwaukee county and vicinity. The Mitchell is temporarily without dealer and distributor representation in Milwaukee and Wisconsin, save a direct factory operation. A service station is being maintained at 62 Sixth Street, pending the appointment of a new distributor and dealer.

Waterloo Motor Sales Co. has been formed at Waterloo, Ia., to take over the assets of the Henry Padden Auto Co. which has been sold under mortgage foreclosure. The company will handle Maxwell and Chalmers cars. The managers of the new company are D. S. Ramage and C. D. O'Harrow, the latter having been in the automobile business in Waterloo for several years.

Kissel Kar Co. of Milwaukee has been incorporated with a capital stock of $500,000 to serve as distributor of the Kissel in Wisconsin and retail dealer in Milwaukee and vicinity. A. Carl Hoppe is president and general manager.

India Tire & Rubber Co. has opened a direct factory warehouse in Dallas, Tex., where a large stock of its products will be carried. Harry L. Corbett, formerly associated with the Norwalk Tire & Rubber Co., will be in charge.

Wisconsin Adds 20,000 Cars First Six Months of 1921

Milwaukee, July 22.—An increase of approximately 20,000 motor vehicles registered in Wisconsin during the first six months of 1921, is indicated by official reports compiled by the secretary of state. The increase is principally in passenger cars, amounting to 18,582. Trucks gained 2,894. A decided falling-off in motorcycles is indicated, the number registered July, 1921, being 5,505, compared with 8,002 on Dec. 31, 1920.

While 1,946 dealers' licenses were issued during 1920, the issue of such privileges in Wisconsin for the first six months of 1921 is 2,049, an increase of 103 dealers. Comparative figures follow:

Classification	1920 Dec. 31,	1921 July 1,
Total registr'ns.	$ 301,300	$ 321,279
Passenger cars	277,093	296,675
Motor trucks	16,205	19,099
Motorcycles	8,002	5,505
Dealers	1,946	2,049
Total fees col.	$3,127,073	$3,453,225

In Wisconsin, while licenses are annual, all expiring on December 31, of each year, the fiscal year ends June 30. The above figures, however, are not so based. The 1920 figures represent the total issue of licenses during the twelve months of last year, while the comparison is with figures representing the issue for the first six months of 1921 only.

PRAISES BUSINESS CONDITIONS

Columbia, S. C., July 22.—Price readjustment in the automobile industry has been about completed in the opinion of A. M. Gibbes, president of the South Carolina Automotive Trade Assn., who has received the final report of the National Automobile Chamber of Commerce, which shows changed prices on the various makes of cars. "The new prices in many cases go back to the figures of a few years ago," says Mr. Gibbes, "notwithstanding that the models, in many instances, are bigger with better finish and such additional equipment as cord tires and improved electrical apparatus.

"In the opinion of students of the industry, the mid-year change has now stabilized the industry to a degree that is bringing increased sales to all companies. Carload shipments from the factories during April and May were 67 per cent of the production for the same two months of last year and there is reason to believe June will be at approximately the same rate. Compared with the feverish rush of automobiles last spring, a two-thirds demand looks to be a big falling-off, but compared with normal years it shows that the motor car business is faring better than other lines."

TO CLIMB 10,000 FEET FOR TROPHY

Stockton, Calif., July 22.—Twenty dealers have agreed to enter the Stockton Chamber of Commerce annual reliability run to Lake Tahoe and the Yosemite Valley this year, according to M. A. Irwin, secretary of the San Joaquin Automobile Trades Assn., and Burton A. Towne, of the Stockton Chamber of Commerce, who are signing up the dealers.

A fine trophy is offered for this run, and dates and conditions of the run will be announced about the end of July. The highest point reached is 10,000 ft. above the sea, in Tioga Pass, and three days are required for the trip. The route leads through some of the highest mountain roads and the most beautiful scenery of the Sierras.